THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XI. No. 249—14th YEAR.] LONDON, MAY 6, 1862. [Subscription per Ann. { 15s. in Advance / 18s Credit.] DOUBLE No. Price 1s.

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4. TWENTY LENGTHS, square Flanched Pipes, 5 in. square bore, 5 ft. long with sundry condenser-bends.

5. SIX MOUTHPIECES and Plates, together with six 4 in. Hydraulic Valves, all suitable to Spinney's Retorts.

Twenty Tons of old CAST IRON (not burnt), and 5 Tons of WROUGHT-IRON SCRAP, &c.

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Swansea, April, 1862.

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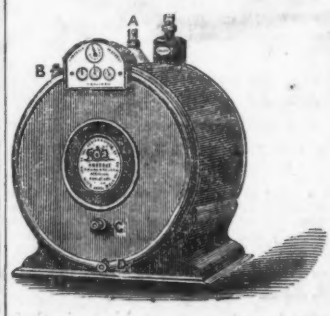
Address WM. PARKER, 65, Marsham Street, WESTMINSTER.

MR. PRESTON LUMB has removed to 42, PARLIAMENT STREET, WESTMINSTER, where he may be consulted on all matters relating to Gas Engineering.

London, March, 1862.

INTERNATIONAL EXHIBITION, 1862.



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WET GAS-METER,
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BISCHOFF, BROWN, & CO.,
Will be exhibited in Class 31 B.

An Experimental Gasholder is attached, and the advantages of the Meter illustrated with explanations.

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TO BE OBTAINED AT
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GEORGE STREET, GREAT PORTLAND STREET, LONDON, W.

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MEDALS AWARDED TO
THOMAS GLOVER'S
PATENT DRY GAS-METERS.

LORD REDESDALE'S "SALE OF GAS ACT."

DRY METERS *VERSUS* WET METERS.

LONDON, February 25, 1861.

THOMAS GLOVER begs to call the attention of Gas Companies and others to a few *facts*, which, if duly considered, must lead to most important conclusions :—

1. That since THOMAS GLOVER commenced to manufacture his Patent Dry Gas-Meters (which is now upwards of 15 years), every Wet Meter Maker of any importance in England has been compelled to manufacture Dry Gas-Meters; and in the JOURNAL OF GAS LIGHTING, of date of 12th of February, 1861, Messrs. William Parkinson and Co., successors to the late Samuel Crossley, advertise that they "intend manufacturing *Dry* as well as" Wet Meters, and it is worthy of particular notice that they intend to do so "after 40 years experience in manufacturing Wet Gas-Meters of such a quality that has enabled them, as they say, to maintain a superiority over all other; and this, be it also particularly noticed, after they had advertised in the JOURNAL OF GAS LIGHTING, January 29, 1861, "their improved low-spouted Gas-Meter with new patent float arrangement, which entirely overcomes the difficulty experienced by ordinary Wet Meter."

2. That it is quite consistent with THOMAS GLOVER's knowledge that Wet Gas-Meters, called "low-spouted" or "compensating Wet Meters," have already been proved to be incapable of continuous working or registration, and for this reason the manufacturers of these Meters have been induced to seek the repeal of Lord Redesdale's (righteous) Sale of Gas Act.

3. That every year the Patent Dry Gas-Meter manufactured by THOMAS GLOVER has risen in favour with Gas Companies and Gas Consumers, placing him in the proud position of being the largest manufacturer of Gas-Meters in the country.

THOMAS GLOVER guarantees his Patent Dry Gas-Meters to meet all the requirements of the "Sale of Gas Act," to give accurate and unvarying registration with steady lights; and, from their peculiar construction, cannot be tampered with, and may be fixed in open situations even above or below the level of the lights. They work with less pressure than Wet Meters, and are not affected by the most severe frost.

THOMAS GLOVER guarantees to uphold all Meters sold by him for 5 years free of expense to the purchaser, or for a trifling per centage per annum will contract with any Gas Company to uphold their Meters of his manufacture for a series of years; and, at the conclusion of such contract, to leave the Meters all in perfect working order.

N. B.—Agents in several parts of England are wanted. Apply by letter, or personally.

WILLIAM PARKINSON AND CO.

(SUCCESSORS TO SAMUEL CROSLEY),

PATENT WET AND DRY GAS-METER MANUFACTURERS, &c.

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Established 1816.

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Which W. P. and Co. pledge themselves to manufacture with the same quality of materials and workmanship as in their Wet Meter, thereby giving Gas Companies and others the advantage of procuring a first-rate Dry as well as a Wet Meter, which, hitherto, they have been unable to do.

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MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.

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TO CORRESPONDENTS.

Z.—*Twelve cwt. of coke, 24 gallons of tar, and 12 gallons of ammoniacal liquor.*

NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing-Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

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All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MAY 6, 1862.

Notes upon Passing Events.

A MOTION by Mr. B. Cochrane for a Commission to inquire into the defects and delays in the execution of the public works under the charge of Government, although lost, led to a discussion which will not be without effect. The debate principally turned on the progress of the buildings in which the business of the nation is carried on. There is no great merchant or manufacturer whose staff is so inconveniently lodged as that of this great empire. The working bees of the different departments are hived wherever offices can be found, at a great sacrifice of convenience, time, and money. The easy theory is, to have a complete plan of what we require made out, with an estimate, and to obtain from Parliament a vote every year for as much as will be needed in a year. But, to carry out this theory requires more than there is any chance of getting—a Parliament in the humour to look a large expenditure on unproductive, although essential work, in the face, and a Minister with the power and the capacity to carry out the required work. If we had *the man* whose capacity and whose parliamentary influence rendered him as able to reform and reconstruct our public buildings as the late Sir Robert Peel, or as the present Mr. Gladstone, to reconstruct and reform our system of taxation, something satisfactory and even brilliant might be done in the course of ten years. But, where is such a phœnix to be found, and, if found, would such talents be content with the humble place of First Commissioner of Works? The First Commissioner is usually selected because he has to be provided for. Lord Llanover was the troublesome member of a noisy parish—Mr. Cowper is the amiable stepson of the Prime Minister. The office is a secondary office, and the man is at best a second-rate, too. It is an office in which technical knowledge is of value if profound, but dangerous if superficial. If Sir Joseph Paxton had succeeded in Parliament and at the Palace of Sydenham as well as he did in Hyde Park, in 1851, he might have climbed to the first commissionership—and very brilliant, and terribly extravagant, and unproductive, his designs would have been. Such a man would, at any rate—if an orator, as well as a political architect—have inoculated the public with grand ideas; and the public is even now in the frame of mind to catch in a favourable form the building disease. See what really grand things private enterprise is doing toward rebuilding the City! Shops, offices, banks, insurance companies premises, have sprung up within the last ten years on the grandest scale, while Parliament and the Government have been haggling over a Foreign Office. Paxton, however, failed to inspire confidence in his calculations; and, having also found something better to do than office, has nevertheless rendered good service by forcing on the Thames embankment, although his committee did select some plans of impossible magnificence. In spite of the Sydenham failure, it is very much to be regretted that he did not have the designing of the Exhibition building. Captain Fowke, with all Lucas and Kelks's dry nursing, has made a terrible mess. He is clever, no doubt—but not clever enough for so big a thing. Sir Joseph, with his experience, would have produced something fine, and useful; but we hear that experience is a disqualification to employment under the commissioners. Having no architects of parliamentary weight, we turn to the engineers, who could supply capable men for a first and permanent commissioner; but they are too busy making money; and it is dreadful to contemplate the public works of London handed over to a Gisborne or a Fowke. It was once gossiped that the late Joseph Locke was willing to accept the office, if it were made permanent—an impossible condition at present. We must resign ourselves for the reconstruction of the Westminster Government offices to the chapter of accidents, hoping the best from Mr. Cowper's successor.

The Thames embankment on the north side seems safe, although the City grumbles that the Metropolitan Board of Works should have anything to do with the street from Blackfriars to the Mansion House. They fear that the Board will perversely do it as badly as possible out of spite to their rivals, the Corporation. At any rate, they cannot make a worse job of it than the City have made of Farringdon and Victoria Streets, Clerkenwell. The North Thames embankment will afford fine sites for public offices, which would leave, perhaps more profitably, the best part of the block between the north side of Parliament Street and the Green Park for private purposes. The attorney-member for Finsbury made the other day, in his capacity, we presume, of common councilman, an onslaught on the Thames embankment plan, contending that the road and street from Westminster to the Mansion House would not relieve the City from its crowded traffic so well as certain smashing demolitions that he recommended. Of course, Mr. Cox only meant to please his fellow common councilmen by attacking a scheme of which they are jealous, and to give his constituents one more smart speech to read, because he must know that to follow out his suggestions would cost at least

two millions, and the embankment in some shape would still have to be made to carry the low-level sewer. The loss on the construction of Cannon Street, which is, after all, too narrow for grandeur, and blocked up at both ends, was about half a million. Mr. Cox proposed to take down Temple Bar, and widen a bit of Fleet Street, a side of Ludgate Hill, a side of the Poultry, and a side of Gracechurch Street; to clear away Holborn Bars, make a viaduct between Holborn Hill and Skinner Street, and widen Newgate Street. Admirable ideas! but not entirely new, having all been ventilated in a report of the late architect to the Metropolitan Board, which we printed at the time. Let us see what they would cost. The improvement of Holborn Hill, £200,000; removal of Middle Row, £50,000; removal of Temple Bar, widening Fleet Street and the Strand for 300 yards (which the Palace of Justice would have done), £90,000; completing improvement of Newgate Street, £116,000; widening the Strand from Newcastle Street to Holywell Street, and removing Holywell Street, £425,000; widening the Poultry, £540,000; widenings in Gracechurch Street, Leadenhall Street, and Fenchurch Street, about £600,000; widening Ludgate Hill (no estimate) say £200,000. Thus, we have an expenditure over two millions which, however urgently required, still leaves the Thames embankment a necessity. It is a pity that some of the metropolitan members do not make themselves thoroughly masters of this communication question in all its details. The sum annually lost in money and time, by the blocking-up of the main streets in the hours of business (an evil daily increasing), must be something enormous. The details would produce more effect on the House of Commons than yards of mere wind-bag speeches. But it is so much easier to let off "bunkum," than to get up facts and figures. What a pity that poor Mr. Roupell, "the friend of humanity" and the Lambeth publicans, did not turn his experience in this direction instead of real speculation, and then, with a yacht and a partridge manor, a neat phæton, a good cook, and a box at the opera, he might have lasted many years, admired by sinners as a swell, and respected by saints as a capitalist.

It has more than once been observed in public discussions, by the engineer of the City of London, that to make the metropolis fit and worthy to accommodate the daily increasing residents and visitors, would require the outlay of two millions every year for ten years. The sooner the public understands this the better. We are glad to see that Mr. Cowper takes credit for the Thames embankment whether he deserves it or not. The feeling may tempt him to do something else equally needed.

In our last impression, we published a communication from that eminent agricultural chemist, Mr. J. B. Lawes, dissecting one of our genial friend Mechi's latest bits of sham science. The alderman had got hold of the unquestionable fact that the sewage from the school of mutton-eating boys, would contain more of the constituents of fertility than that of bread and potato-eating peasantry; but, not satisfied with this obvious inference, the alderman pushed on his fallacious comparison between human beings and sheep, and insinuated that just as the manure of animals fed on corn and cake is better than that of those fed on grass or straw, so the manure of aldermen in November would exceed in value that of those content with a plain joint and pudding. Mr. Lawes, like all other educated men, being rather tired of displays made on the strength of books read the day before, exposes the agricultural alderman's fallacies by an illustration, which will bear repeating. A dinner at Goldsmith's Hall, including nine sorts of fish and *entrées* in sauces too delicious to be named, washed down with wines of fabulous age and price, cost, perhaps, £3 a head. "The manurial value would not be a farthing a head, or about 13/000th part of the cost." Again Mr. Alderman Mechi estimates the manure of a human being to be equal to that of a sheep—"The dry matter of a sheep is several times, and the nitrogen about twice as much as that of a man." Thus we see that the most accomplished of aldermen is small as an agriculturist, and still smaller as a chemist. But he talks well, and would make a more creditable Lord Mayor and baronet than many of the roll who stand between him and the "chair."

A paper read at the Society of Arts on Wednesday, the 23rd ult., by Mr. Sidney, "On the Effect of Prizes on Manufactures," will excite more interest abroad than at home. The title was a mistake. It should have been "On the effect of Prizes in improving *English* Manufactures." In this country, State monopolies have long been abolished; the last vestige was to be found in the announcement that the Queen appeared in a robe of "Spitalfields silk." The late Prince Albert, early in his career, promised silk-stocking weavers that, although he could not wear silk stockings and shoes, instead of boots, he wore, and hoped the public would wear, silk drawers. The difference between England and other countries is so great that they cannot understand each other on matters of trade. Frenchmen dote on ribbons, crosses, medals of honour in gold, silver, and bronze. They are evergreen schoolboys, according to the *Revue des Deux Mondes*, never so happy as when being "crowned." Here our manufacturers, without exception, look on prizes as an impertinence and a humbug. But, of late, the multiplication of societies has led to the multiplication of prizes. The popularity to be obtained by offering and bestowing a prize of £10 is so cheap, that many amateurs with ten pounds to spare, take this short road to a display of local patriotism. The two great prize-giving societies are the Society of Arts and the Royal Agricultural Society. Mr. Sidney challenged the members of the first society to relate what their prizes had produced in 150 years. No one answered him! The Royal Agricultural Society is governed by landlords, who have no idea of giving up the dignities involved in bestowing prizes broadcast; but even their system will not stand examination. For instance, Mr. Fisher Hobbs, one of the oldest members of the council—a real farmer, and firm believer in the prize system—asks for impossible conditions, in the following report on the Carlisle trials, so far back as 1855:—"The conditions of competition laid down by the society for portable steam-engines, have, unfortunately, led to the production of engines only intended for winning the society's prize, and known as "racing" engines, requiring the nicest care, instead of those simple and effective engines which may be safely intrusted to the management of intelligent farm servants. This result has, I fear, arisen from too strict an attention being paid to the condition relating to the economy of fuel, without a corresponding regard being had to the general character and usefulness of the engine. A judge-engineer reporter said: "In some cases, two classes of engines are exhibited—the 'racer,' to win the prize; and the working engine, for sale." Again, Mr. Hobbs said: "On looking back through my period of office to its commencement at Lewes in 1852, I think the society has reason to congratulate itself upon the steady improvements in agricultural implements and machinery which have, year by year, continued to mark its progress. . . . The trial of agricultural machinery should be more adapted to the ordinary work required of the several machines employed on the farm; and the judges ought, in every case, to be men of great practical experience and independence of mind." On the other hand, the implement-makers are unanimous in asking for detailed reports, instead of prizes, or with prizes. But first, second, and third prizes, save judges a great deal of trouble in thinking and reporting. If the Royal Agricultural Society cannot give satisfaction in awarding prizes—if they are obliged to *compel* unwilling manufacturers to compete, as they do—the Commissioners of the International Exhibition may be excused for declining the impossible task of obtaining verdicts on the comparative excellence of the whole world. Mr. Sidney puts the question in a form that cannot be answered by mere rhetoric:—"The offer of prizes to be printed for standard articles of trade, such, for example, as cloth, clocks, musical instruments, steam-engines, cutlery, and agricultural machines, assumes:—First, that customers are not competent to select what they require. Second, that there are tests or trials by which the marketable value of the articles in competition can be ascertained. Third, that judges can be found competent to direct and appreciate the comparative tests, and sufficiently free from local or natural prejudices to be impartial. Fourth, that there is some security that the articles rewarded are average specimens of the goods the successful manufacturer has sold or intends to sell." On one or all these points it will be found, on examining the records of prize-giving exhibitions, that the prize system has invariably broken down. Mr. Hawes thought Mr. Sidney ought to have included patents and their effects in his paper. Has Mr. Hawes industry enough to get up a paper on the effect of the patent law? He has words at will—let him find facts. But a paper is more trouble than a speech of the worst style.

The International Exhibition opened without any enthusiasm, and promises to be a success, as a great bazaar, and an unrivalled picture-gallery. There is so much to be done, that our

country friends will lose nothing by putting off their visits for a month; but, when they come, they will be rewarded for their pains. The permission to make sales openly alone insures the success of the undertaking. The building itself is not picturesque, but very light and comfortable; not too hot, except under the huge domes—the most pretentious, and least successful part of the pile. It is easy to criticise the colouring, executed under the greatest difficulties; but, on the whole, it is satisfactory and creditable to Mr. Crace. The press is, with reason, making war on a series of mean jumbles called trophies; but, it is to be feared, it is too late to get rid of even the worst.

Amongst the real fine trophies, are those which would have been excluded in 1851—war weapons, in every stage of manufacture. Strange to say, the machinery and agricultural departments seem more advanced than any other. It is too early to enter into any details; but at present, Woolwich, Elswick, and Sheffield, seem to claim the chief honours in manufacturing power. The foreign courts are still full of workmen. Australia shows a rampart of wool-bags. In the refreshment department, the commissioners have been most fortunate. We shall be able to show foreigners fine samples of English railway-station fare; buns and pork-pies, in solid regular order, bearing testimony to the capacity of English digestion. For our part, we should prefer the steel chips from the Woolwich factory, which Mr. Anderson displays in a glass case.

METROPOLIS LOCAL MANAGEMENT ACT AMENDMENT BILL.

This very unsatisfactory measure continues to drag its slow length along in committee, and is evidently treated by the *dilettanti* legislators of the day with about the same amount of attention that they usually bestow on the vital problems connected with the true interests of humanity. A Bill, likely to affect the domestic comforts, or the municipal organization, of a city of 3 millions of inhabitants, hardly secures "a quorum;" and it is debated with about the same indifference that a question likely to affect the happiness of 100 millions of our fellow-subjects in the East would be. The principles involved in the Bill, or in the various amendments hitherto proposed to the House, are only alluded to in a slight and incidental manner; and, as if by common consent, the discussion is carefully maintained in the narrowest limits, and is conducted in the least philosophical spirit it would be possible to imagine. One honourable member has, it is true, taken an opportunity for praising Mr. Thwaites's conduct in his official capacity; and another has discovered that there would be inconveniences in the attempt to alter the constitution of the Board during the execution of the great work intrusted to it. But, hitherto, no one has boldly grappled with the fact that the position of an irremoveable chairman of a municipal body is a startling anomaly in a country which prides itself on its representative institutions, however well the actual chairman may discharge his duties; and even Mr. Ayrton proposes a return to the constitutional method of election to the Board, in a manner which almost indicates that he himself has no conviction of the importance, or of the ultimate result of his own amendments, in case they were successful—nay, more, it is to be feared, from the terms he uses, that he has but a very superficial acquaintance with the subject he has undertaken to work out. The discussion in the committee of the whole House on the Bill was not, however, concluded on Wednesday last, and Mr. Ayrton's proposed clauses were actually under consideration when the House was adjourned. Under these circumstances, it is still possible that some independent member may be induced to treat the important question of the municipal organization of the metropolis with more attention than it has yet received, and bring to bear upon it a more philosophical, and a more truly statesmanlike intellect than has yet been devoted to the discussion. Perhaps, it is but "hoping against hope" to look for any such fortune in a House of Commons composed as the present one seems to be; but the duty of the technical press in this matter is not the less imperative, and we hold that, in season, and out of season even, we are bound to keep the subject before the public as far as lies in our power, trusting that, sooner or later, the Legislature may treat it in a proper spirit.

In fact, during the debate of Wednesday last, the only objection which was raised against Mr. Ayrton's clauses, that is to say, the only one which had any real value, was the one we have already noticed—namely, that they virtually involved a radical change of the whole organization of the Metropolitan Board, and therefore ought not to have been introduced in committee. This, we have admitted to be true; and, much as we approve of a radical change in the constitution, and the mode of election to the Board, we object most decidedly to securing it, by what certainly has the appearance "of a side wind." Mr. Ayrton and his friends were decidedly to blame for allowing the principle of the present Amendment Bill to pass without open challenge, and without debate; but, parliamentary tactics are now so adroitly managed, that it is easy to understand that the Bill may have slipped through its first stages without notice on the part of lukewarm opponents. The same parliamentary tactics, however, which allow a Bill to be hurried forward, allow its progress to be stopped at any subsequent stage; and Mr. Ayrton has a perfect right to propose clauses to be added to a Bill which may entirely alter its character, even though the exercise of that right be objectionable on strict moral grounds. Mr. Ayrton's omission to oppose the second reading will, in all probability, enable the proposers of the Amendment Bill to secure the rejection of his clauses in committee; but, in the House of Lords, there is still a possibility of raising a debate on the whole subject; and, there is nothing to prevent Mr. Ayrton from bringing in, at some future period, a substantive motion for the reform of the Metropolitan Board of Works. The latter course seems to us to be the most desirable one, not only on account of the immediate subject involved, but because it would afford the opportunity for an investigation into the whole of our municipal law. But, it is more than questionable (to us at least) whether Mr. Ayrton has either the intellectual power, or the technical knowledge, required to grapple with a question of such magnitude and importance.

Thus, Mr. Ayrton objected to a clause proposed to be added to the Bill by Mr. Bristow, for the purpose of enabling the Metropolitan Board, with the sanction of the Secretary of State, to subdivide districts in case of increase of population, on the ground that no such change ought to take place without the sanction of Parliament; but, really if the Board were a truly representative body, there could be little reason for interposing any difficulties in the way of its autonomic action in these matters of detail. Composed as the Board now is of vestry delegates, it is certainly not desirable that it should be brought under the control of the central Government, instead of that of the Legislature; but the real danger of Mr. Bristow's clause lies rather in the want of independence of the members of the Board, under the present system of election, than in any fancied removal of parliamentary control it would be likely to produce. At the present day, in fact, this control is a mere farce; and the wholesale manner in which the confirmatory Bills emanating from the numerous governmental Boards are disposed of in every session, proves that the guarantee they are supposed to offer is illusory, even if stronger terms be not applicable. Mr. Ayrton was fighting with a shadow in this case; and it is a singular illustration of his want of tact, that he should thus have wearied the House on a matter of no real importance, just before he himself was about to endeavour to lead it into a discussion of principles of rather a more abstract nature than are usually brought before it.

Then, it may fairly be questioned whether it be wise to make the elections to the Metropolitan Board annual, as Mr. Ayrton proposes. It is true that the Court of Common Council is elected every year, and that the results of that system have been, on the whole, far more satisfactory than those of the *doctrinaire* system of partial triennial elections; but the business transacted by the Common Council is of a very different magnitude from that which, in a period more or less short, must devolve on the Metropolitan Board. It has happened, too, fortunately for the Common Council, that there is not so keen a competition for the seats of that body, as there would be in the more conspicuous metropolitan Parliament; so that, practically, when a man has been elected to the former, he usually retains his seat as long as he conducts himself in accordance with the opinions of his electors; whereas, in the latter, it is to be feared that the changes produced by an annual election would endanger the positions of many of the most useful, but least showy members. There is also danger, in the case of electoral bodies of short periods of duration, that the frequent changes amongst the members of those bodies may transfer the real power to the officers, who do not change periodically, and who must be consulted by their new masters, on account of the experience and the business routine

they possess. Representative bodies require experience and knowledge of detail as much as other governing bodies; and these are only to be obtained by a longer acquaintance with the management of affairs than is consistent with annual elections. In fact, the power of the officers of the corporation of London may be cited as an illustration of the working of the system Mr. Ayrton seeks to introduce; they lead the Common Council far more than they obey it.

As for the objection put forward by the Lord Mayor, to the effect that Mr. Ayrton's clauses were, after all, but "an insidious attempt to create a democratic corporation for the whole metropolis," the latter gentleman, had he been thoroughly convinced of the truth of the principles he advocates, might have at once answered, "that he *did* mean to propose a municipal organization to represent the popular interests of the whole metropolis, in contradistinction to a close corporation representing the jobbery of a very small part of it." It is, however, amusing to find a man like Mr. Cubitt affecting to draw a parallel between a *democratic* corporation for the whole metropolis, and the *aristocratic* body over which he presides; but the barley-mow always entertained a contempt for its neighbour! We suspect that Mr. Ayrton was also wrong in saying that the qualification for voters to the existing vestries was the occupation of a house rated at £20 per annum; but the confusion in this matter, introduced by the Metropolis Local Management Act is so great, that he is excusable for not having been able to discover what really constitutes the vestry franchise. Unless we are greatly mistaken, the property qualification to vote for the election of vestrymen is much smaller than Mr. Ayrton states it to be; yet still it is quite as high as the qualification to vote for members of Parliament, and, though the representatives of the Metropolitan boroughs are by no means good illustrations of the intelligence of its constituency, it little becomes men like Mr. Cubitt to sneer at "the sweet voices" he himself so vainly wooed. These are personal, and are attempted to be made party questions; but the one really involved is, how the public business of this huge metropolis is to be conducted in the most satisfactory manner to the majority of its inhabitants? Whoever contributes to taxation, as an abstract principle, has a right to some degree of control over its expenditure. In practice, it is found to be desirable to place some restrictions on the strict application of this principle, but the tendency of the age is to enlarge the limits of those restrictions, in proportion to the increasing intelligence of the masses. The attempt to raise a cry now-a-days against a democratic corporation is a strange anachronism —one which is stranger still when raised by a man who has himself risen by his own merits; and Mr. Ayrton would have adopted a nobler (and ultimately a more successful) course, we believe, if he had avowed that he *did* desire to secure a democratic corporation for the whole metropolis. It is this which *is* wanted; the defect of the Local Management Act consists precisely in substituting a mere shadow in its place. The efforts of all true far-seeing politicians ought to be directed to converting that shadow into a reality. Words ought not to be things—a democratic institution ought not to be a bugbear. Properly understood, the word only means an institution for the popular benefit, and therefore it ought not to inspire dread amongst the representatives of the people. The real objection to the Metropolis Management Act lies in the insincerity of its application of the representative system, and, under such circumstances, the body which is elected to carry it into operation is not ever likely to acquire that public confidence which Mr. Ayrton justly considers to be a primary necessity for its existence; for, although hitherto the Metropolitan Board have not committed any grievous blunders, there is no security against such a contingency. The best security for this purpose would be a direct connexion between the Board and the public it is supposed to represent; and, if that can only be obtained by a democratic corporation, it would be better at once to accept such an organization.

We do, moreover, distinctly assert, that the maintenance of the separate corporation for the City of London, in its present form, is a great anomaly at the present day, and that a corporation for the whole metropolis is actually wanted. The institution of the Thames Conservancy Commission is one recognition of this opinion, in so far as the interests of the navigation of that river are concerned: the establishment of the Metropolitan Board of Works is another, in so far as the sewerage and the arterial improvements of the town are concerned. The other municipal services—such as the street paving, lighting, and water supply, the telegraphic communications, and the public conveyances—require, however, quite as vigorous an organization as the navigation or the sewerage; and, sooner or later, they must be grappled with. The debate upon the Bill now before the House would furnish an excellent opportunity for bringing these questions fairly into notice; and most bitterly is it to be regretted that the opportunity should be allowed to slip away. As for the present moment being an inopportune one for entertaining any proposal for a change in a system, which even its defenders admit (as Lord John Manners did) to be unsatisfactory, we know that at any other period the same objection would be raised—for reforms are never opportune to office-holders. Let us hope, then, that when the debate shall be resumed to-morrow, it will assume a broader and more philosophical character than it has hitherto done; and that it may be directed more seriously towards the discovery of the best method of securing the real interests of the metropolitan public, than towards the defence, or the praise, of the officers who have hitherto been intrusted with the control of the public works of this marvellous city. No one is more ready than we are to admit the merits of Mr. Thwaites; but his merits do not change the nature of the position he fills, nor do they cause the public to have confidence in the Board he is supposed to guide. A radical change in both respects—that is to say, in the composition of the Board, and in the position of its chairmen—are required to secure the public confidence, without which they had much better cease to exist.

May we not here observe that, if a really strong municipal organization of the metropolis had existed, the public would not lately have been exposed to the inconvenience and annoyance it has endured from the stoppage of the New Road for about two years, or from the repaving at the same time of Drury Lane, Chancery Lane, and Holborn? There must be a strange faculty in our London population for helping themselves, when they can thus tolerate the inconveniences thus caused by the incompetence of their rulers; but are there no limits to the exercise of these taxes upon our patience?

Circular to Gas Companies.

After the lapse of eleven years, there is once more gathered together in this country a collection of the natural products, and the works of industry and art of all nations, in a building especially erected for their display. During the eleven years that have passed since the opening of the first Great Exhibition, which was vainly imagined to be the inauguration of universal peace, fierce wars have raged in every quarter of the globe; and, at the time when this second temple of peace opens its gates, a fratricidal warfare, more bitter and on a larger scale than was ever known, is rending asunder the ties that joined the North American States, and prevents them from exhibiting their progress in invention and manufactures. Yet, notwithstanding circumstances so adverse to the promotion of the arts of peace—notwithstanding the lamented death of the Prince, at whose suggestion and by whose countenance and energetic support these gatherings were planned and fostered —the International Exhibition of 1862 will far surpass its predecessor in the number, the variety, and the excellence of the objects collected in its more capacious halls. The stimulus given to improvement by the rivalry of 1851 has, no doubt, contributed greatly to this result, for each nation having then had an opportunity of measuring its rivals strength, and of profiting by their examples, they all engaged in a race of competition, which has placed most of them in advance of the positions they before held. In the present state of confusion in the building, and in the absence of numbers of articles which have yet to be unpacked and arranged, no correct idea can be entertained of the comparative progress of different nations; but sufficient is already disclosed to show the general superiority and the greater variety of the works now contributed, compared with those sent in 1851; and the large increase of foreign exhibitors, who amount to 14,000, shows that they have accepted the challenge of competition with eagerness and confidence.

In the present imperfect state of preparation, the Catalogue is of little use as a guide to the objects exhibited that relate to our special department of industry; and it is impossible, amidst the confusion that still prevails, on the fourth day after the opening, to indicate with correctness many of the things exhi-

bited, or the names of the exhibitors. We must, therefore, reserve a more particular account for our next number.

The petroleum oil-wells of the United States and of Canada are attracting considerable attention as the value of their produce becomes more appreciated, and the quantities raised from the wells continue to increase; and, should the present supply remain undiminished, these fluid hydrocarbons may become formidable competitors with coal in the production of gas, even in Europe. We have copied, in another page, an interesting article on the subject from the *Journal of the Board of Arts and Manufactures for Upper Canada*, from which it will be seen that the question has been raised, whether it is not more convenient and cheaper to use the rock-oil from Canada than the coal from Newcastle or Scotland in the manufacture of gas. It appears that a larger quantity of gas can be produced by the destructive distillation of fifty gallons of the petroleum oil, weighing 8 lbs. 6 oz. per gallon, than is yielded by one ton of Newcastle coal, and the illuminating power of the gas is stated to be three times greater than that of ordinary coal-gas in Canada. Assuming the statements in the journal we have quoted to be correct, nearly 50,000 cubic feet of gas, equal in illuminating power to 150,000 feet of ordinary coal-gas, might be produced from one ton of petroleum oil. It seems, therefore, that fifty gallons of the oil, weighing about 428 lbs., which it is said might be sold in England at 1s. per gallon, would produce as much gas, of at least an equal illuminating power, as one ton of Boghead that costs in London 60s. Toronto is at present lighted with gas made from the rock-oil; and we are informed that a portable gas-retort, with purifier and gasholder, have been sent to the International Exhibition, in the hope that the Canadian Court may be lighted with petroleum gas. No details are given of the process or cost of manufacture; and, in the absence of precise information of the volume of gas produced from a given quantity of the oil, and of its illuminating power, no correct estimate can be formed of the practical value of the material for the manufacture of gas, though there can be little doubt it might be advantageously employed for the purpose, if it can be supplied at the price stated. The rock-oil is extensively used in America for burning in lamps, but the large quantity of highly volatile naphtha it contains renders its use dangerous, and the many accidents that have been caused by a similar material in this country will prevent it from being generally employed as a burning oil. The chief value of the petroleum oil in Europe will be derived from its application to the manufacture of gas, and experience only can determine whether the supply will continue sufficiently abundant to meet the demand which such an application of it would occasion. No diminution has yet been observed in the flowing wells. There is, indeed, an embarrassing superabundance of the oil waiting for a market, and many of the wells have stopped working in consequence. It is conceived that as yet only the superficial fountains have been reached, and that deeper borings "will reach the sources from which petroleum has been slowly oozing for centuries, perhaps for thousands of years." It is possible that extensive reservoirs may exist, into which the shales charged with hydrocarbons may have drained, but the notion that there are perpetual springs of oil, as there are springs of water, has no reasonable foundation. The beds of shale, which are the real sources of the oil, have their limits like beds of coal, and the quantity of oil they exude must diminish more and more rapidly as the reservoirs into which they have hitherto deposited the fluid with which they were saturated become emptied. It is beyond conjecture what may be the quantities of oil stored up in the rocks; but, as the most abundant springs of water fail after a long continuance of dry weather, it is natural to conclude that the oil-springs, whose sources have no renewing, will fail to yield their accustomed quantities, should the demand be largely increased.

The carburetting process which is on trial in the City is not found to answer so well in practice as its experimental exhibitions gave reason to expect. We are informed that considerable dissatisfaction exists respecting the inequality and the deficiency of the light of the public lamps, to which the "Carburating" Company have applied their method of naphthalizing gas. A notice of a motion to be made by Mr. Deputy Lott stands for discussion at the meeting of the Commissioners of Sewers, to be held to-day, to the effect—"That it be referred to the engineer and the medical officer of health, to examine and report to the Court whether the light from the gas-lamps, in the public streets, is increased or diminished by the carburetting process, and whether the light thrown upon the footways is not obscured by the shadow created by the tin boxes containing the material for the carburetting process." From personal observation of the imperfect illumination effected by the lamps in question, we can report that the objections are well grounded, and that the 3-feet burners supplied with gas that is naphthalized, give an inferior light to the 5-feet burners supplied with ordinary gas. The difference in illuminating power is, indeed, so strongly against the new plan, that it is not improbable a deputation from the citizens may soon wait on the commissioners to express their dissatisfaction, and to request that the old 5-feet burners may be restored. We are yet without information respecting the cost to the company of carrying the process into operation; and, when it is known, we may find that, unsatisfactory as the experiment has been to the public, it may actually have cost more than the value of the gas saved by the adoption of the process. An accident arising from the ignition of naphtha in a defective naphtha-box has occurred, at a lamp in Bridge Street, Blackfriars, which shows the danger of this mode of naphthalizing gas close to the burner. No damage was done beyond the destruction of the lantern and the tin box, but the explosion caused some alarm to the passers by, and it may serve as a caution against the adoption of the process in the illumination of theatres or other public buildings, and still more strongly against its introduction into private houses.

The coroner's inquest on the bodies of the two men who were killed by the explosion of gas in Holborn, has completed the evidence that was wanted to elucidate the cause of the accident. It seems nearly certain that the stop-cock of the "bladder" must have been interfered with, either thoughtlessly, by boys who were playing round the workmen, or accidentally, and that the air having partially escaped from within it, the bladder collapsed and allowed the gas to pass into the attached length of new main to which the service-pipes were being connected. Here, then, we have another instance of dearly-bought experience which may serve to prevent the recurrence of accidents from such a cause; for if, as one of the jurors suggested, the expedient had been adopted of screwing on a cap at the end of the tube, the danger arising from the accidental turning of the stop-cock might have been avoided. The evidence seems to prove that the gas was ignited by the hot iron of the plumber, who was making a joint in a water-pipe that had been injured during the laying of the main. The fire by which it was at first supposed the gas was ignited was in the middle of the street, and at too great a distance, the witnesses believed, to have communicated with the escaping gas. If the explosion was caused by the hot iron, it is a curious fact, for it has been generally understood that gas cannot be ignited without flame, excepting by the electric spark. It is well known that even the white hot sparks of steel, struck off by flint, will not explode carburetted hydrogen, of which the steel-mills, whereby dangerous coal-mines were dimly lighted before the invention of safety-lamps, afforded a practical illustration. We cannot suppose, therefore, that the dull red heat of a plumber's iron can be sufficient of itself to ignite an explosive mixture of gas. It might, however, be the intermediate cause, by setting fire to some light inflammable particle floating in the air, and the small flame thus produced might be sufficient to explode gas. Another source of danger to be guarded against in laying mains, and in connecting service-pipes is thus disclosed. The explanation we gave in our last of the cause of the bursting of the main at the end farthest from the supply of gas, while the portion nearest to it remained uninjured, is confirmed by the evidence of the plumber, who observed two distinct explosions, the first of which occurred close to the junction of the newly attached length of main with the main that was fully charged with gas; and it was succeeded, after a short interval, by the explosion at the farther end that produced all the injury. Had the mixture of gas and atmospheric air been equally explosive throughout, the explosion would have been instantaneous, and its destructive effects would not have been so confined. It seems that the proportion of gas near the end where it ignited, though too great to be violently explosive, was yet sufficiently so to communicate rapidly along the pipe, and, becoming by the greater proportion of air more and more explosive as it advanced, it at length attained sufficient force to burst the main.

The Court of Queen's bench has refused to disturb the verdicts rendered in the cases of Mr. Train's railway, and the United Kingdom Telegraph posts, and has thereby maintained the ruling of the judges before whom the cases were respectively

tried, and which trials have been already fully reported in our columns. The Birmingham and Staffordshire Gas Company have also failed in their application for a new trial in Timmins's case, for suffering the water from one of their tanks to leak into and spoil the water in an adjoining well; and the Court of Common Pleas has definitively ordered the verdict in the case of *Horton v. Mabon* to be entered for the defendant, on the ground that the application of double-angle or trough iron to the lutes and dips of telescope gasholders could not be made the subject of a valid patent, as similar iron had been used before for other purposes, and was well known at the time the plaintiff took out his patent.

We reprint the accounts of the Phœnix Gas Company in the form in which they are lodged with the Home Secretary, in compliance with the Metropolis Gas Act, 1860, and we shall be glad similarly to reprint the accounts of such of the other metropolitan gas companies as have adhered to their old forms in the accounts they present to their shareholders at their general meetings.

The Parochial Assessments Bill remains in abeyance, and no steps whatever have been yet taken for convoking another meeting of the select committee. Petitions from gas and water companies against the measure continue to be presented daily, and the Bill being a public one, there is no limitation to the time within which such petitions may be received. It is, therefore, desirable that their numbers be increased by petitions from all who feel themselves aggrieved either by the operation of the existing system, or by the alterations proposed to be made in the law of assessment.

Communicated Article.

REMARKS ON THE MANAGEMENT OF CLAY RETORTS.

By Alfred Kitt.

[*Continued from Page* 216.]

A sectional elevation of a bed of eight large circular retorts, 18 inches in diameter, and 20 feet long, is represented by figure 17. This setting is admirably adapted for works where the make of gas is very large, and where space is of value. The height of the oven is 10 feet 6 inches from ground-floor; the width of the bed is 7 feet 3 inches; there are three rings of brickwork in the arch, two of which should be of fire-brick; parting walls, 18 inches thick; the width of the furnace at the bottom is 8 inches, splayed out to 18 inches at the top: it contains two fire-bars. The back of the furnace gradually slopes off, and rises to the back wall, dividing off the bed in two distinct parts. The 9-inch arch over the furnace is carried entirely over the fire to the back; it has suitable nostril-holes in its centre, as seen in the cut, at proper distances over its entire length, through which nostril-holes the fire passes to the top of the bed. Over the furnace-arch are placed two other 9-inch arches, resting on the sides of the retorts carried over for the supports of the upper retorts, as well as to keep them in position; between the arches, 14-inch openings afford a free passage for a thorough draught, taking the direction of the arrows shown in cut, and passes down the side of the bed to the flues. The arch over the furnace, it will be seen, is supported on solid lump-work, carried up from the bottom; this insures a firm foundation for the upper retorts, and no better arrangement for setting a stack of eight large retorts can be made than by placing them one over the other, and allowing the heat from the furnace to have full play up the middle of the bed, as it not only saves a large amount of fuel by economizing furnace heat, but wear and tear to a great extent are reduced; all the retorts in this setting are equally exposed to the action of the fire, and, where retorts are set at once over the furnace, the result is a greater amount of wear and tear, and, as I have before stated, their duration cannot average those of the others. The upper retorts in this setting being 7½ feet from the ground-floor, will require a wedge-shaped platform to enable them to be more conveniently charged and drawn. This bed of retorts is capable of carbonizing eight tons of coal in the twenty-four hours, at six hours charges; and, by producing 9000 feet to the ton, 72,000 cubic feet are obtained: so that a stack of twelve of these ovens will make upwards of 864,000 cubic feet of gas in the twenty-four hours; and, if we allow two beds out of the twelve for scurfing and for repairs, we have still a make of upwards of 700,000.

It is not advisable where duration and economy of working clay retorts are studied, to set more than seven or eight in one bed to one fire. In most gas-works, a bed of eight large retorts is too much to be charged, or to be let down at one time; and, in the event of one or two of the retorts breaking up by wear and tear before the others, the furnace requires to be still kept up for those remaining; hence, where a large number of retorts are placed in one oven, continual patching up and repairing are required to keep

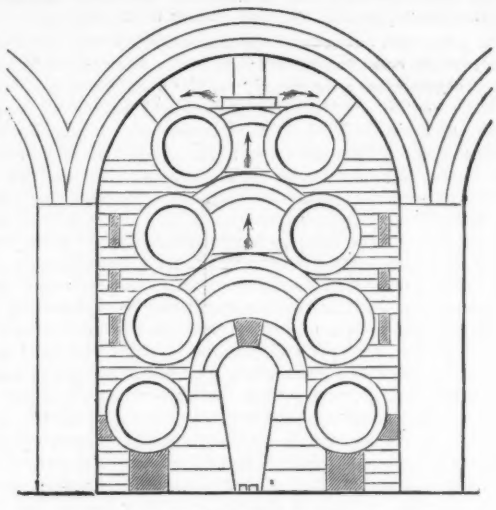


Fig. 17.

all the retorts in action. We must also take into consideration the difficulty of working the upper retorts, and the additional cost of the necessary machinery for drawing and charging. To economize space, several of the metropolitan works set ten to twelve in one oven, and charge and draw the top retorts by means of a moveable stage on wheels; the hot coke being either run directly into the furnace from the retort by means of a wrought-iron shoot, or else into the coke-hole beneath. Mr. Croll uses a double stage, or flooring in his plan of combining clay and iron retorts together in two beds with one fire.

Where a difficulty is experienced in setting retorts of all one kind in ovens, it is sometimes convenient to place them of various shapes and sizes to properly fill in the bed. Indeed, most of our present retort-beds can be more accurately filled up by the various kinds and sizes, and a more uniform heat can be maintained than by retorts of all one kind set in the same bed. The advantage of a setting of oval, round, and D-retorts is, that it enables us to judge more accurately the duration of each retort, and its capability for carbonizing; these, and other reasons, have induced many engineers to work retorts of different shapes and sizes in the same arch.

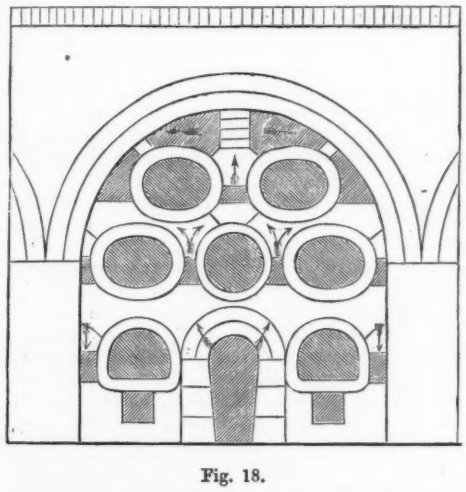


Fig. 18.

Fig. 18, is a sectional elevation of an oven with seven large retorts, 18 feet long, drawn to a scale of ¼ of an inch. The size of the oval and D-shaped vessels is 21 × 15; the circular is 18 inches in diameter. This oven is capable of carbonizing 6 tons of coal in the 24 hours, producing 54,000 cubic feet of gas in the 24 hours; and, as gas engineers generally estimate the value of clay-retorts by the total quantity of gas made during the whole time they are in action, the advantages of this setting will be apparent, both in a large quantity of gas being made in a small space, and a small fuel account; the retorts, being at a convenient height, can be charged and drawn with facility, and in this respect save labour. In calculating the cost of retorts by the make of gas, we must make proper allowances for labour and repair. The cost of retorts against fuel, or wear and tear against fuel, is a question which must be decided by the value of the products, viz., coke, breeze, &c.

Brick ovens made of first-rate quality of fire-bricks, and properly put together, may be heated to a greater heat than would be safe for clay retorts; less injury being done to the former by variation of heat than to the latter. By an increased heat, and the charge of coal being in a thin layer, a greater quantity of gas is obtained at shorter charges, and of better illuminating power, which is generally the case when short charges are adopted. The great superiority of brick ovens is their durability, economy in the annual expenses of repairs, and less annoyance at the works by continually pulling out and replacing retorts, and refixing ascension-pipes, &c. A much superior coke is also considered to be made—an item deserving of attention where coke sells readily. Fig. 19

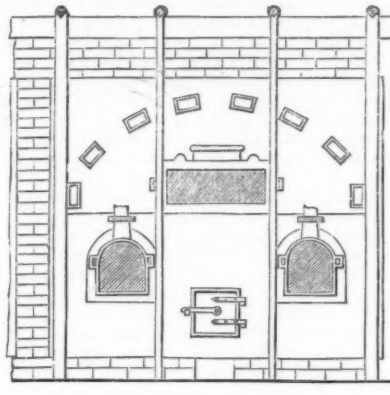


Fig. 19.

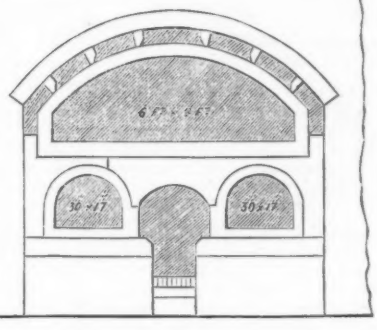


Fig. 20.

is a front elevation, and fig. 20, a cross section of Mr. G. Emmott's brick ovens, which have been very successfully worked in the north of England for nearly thirty years. He estimates one double or through set as being equal to about ten ordinary-sized clay retorts. One stoker works two single or one through oven, and carbonizes 42 cwt. of coal for his day's work, with much less labour than the same weight of coal in ten clay retorts. With ordinary care, Mr. Emmott states one of these ovens will last twelve years, and it is not advisable to use them longer without entire renewal.

The first cost of one through set, including all the pipes and hydraulic main is	£200	0	0
Annual repairs, £12 for 11 years	132	0	0
Renewal, using some old materials	120	0	0
Annual repairs £12 for 11 years	132	0	0
Years 24)	584	0	0

Making the cost of plant and repairs per annum £24 7 0. Such an oven working ten months out of the twelve, will produce 13 million cubic feet of gas. These ovens are composed of bricks, tiles, and lumps, moulded to patterns made for the purpose, lap-jointed, rabited, grooved, or dove-tailed; 13 patterns are required to make one set of ovens; and, when built, they ought to be perfectly set, and well dried before being heated for use. Nearly the whole of the front is of cast-iron plates, and these are supported by strong pilasters, and bound together by tie-bolts, and secured against the front of the retorts by wrought-iron bolts, built and fixed into the brickwork. Many of these ovens may be seen where they have been very successfully worked at Oldham, Huddersfield, Ashton-under-Lyne, Staleybridge, Darlington, and many other places.

Brick ovens are also entirely used at Cheltenham, and are very successfully erected and worked by Mr. Esson, who has considerably improved on the plan of their first erection. One set of brick ovens, 3 in one arch, the upper retort being 5 feet wide by 14 inches high, and the lower ones 18 inches by 12 inches, is reckoned as being equal to a bed of six ordinary retorts, both as to the first cost of putting up, and the quantity of gas produced. The average cost of keeping such an oven in repair is 50s. per annum—a very trifling sum, when it is considered what a large amount of gas is produced. I have been informed that the duration of many brick ovens has been fourteen years, and, in several instances, seventeen years; but it becomes a question of experience, whether it is not better to incur the cost of renewal, than to put up with the leakage which must necessarily ensue from retorts or ovens which have been so long a time in action. To lessen the leakage, which is always more or less incident to clay ovens, it is better to work them without the use of the hydraulic main, and with merely an hydraulic-valve arrangement, to shut off when the oven is opened for recharging. There being no pressure on the retort, the gas escapes more readily, and with advantage to the make of gas.

The duration and satisfactory working of brick ovens are obviously dependent on the mode in which they are set. The bricks and tiles used should be of the very best quality, rabbited, grooved, or dovetailed, or double-grooved and double-tongued on the two sides and ends, and all put together with the greatest care, being chiselled true, and well jointed together. Fire-clay, which contracts under the influence of heat, requires greater care in setting, and the best materials to be employed.

The fuel used in heating such ovens has been, and is still, estimated as equal to 10 or 15 per cent. above that used in heating clay retorts; and it is not thought advisable for any gas company to adopt the system of clay ovens whose requirements are not upwards of 40,000 cubic feet per day.

In concluding those observations on the manner of setting, I shall notice one or two details connected with working clay retorts. The great cost of working them arises from scurfing or clearing off the deposits of carbon which accumulate in the retort every three or four weeks, and to such an extent as to prevent the scoop from being used; the cause of this incrustation arises from the clay absorbing very readily some of the deposits of the coal, and the decomposition of much tar, the carbides of hydrogen and the hydrocarbon vapours. It also partly arises from pressure, as is proved when clay retorts are worked without the use of an exhauster. The higher the temperature at which clay retorts are worked, the more rapid is the deposition of carbon, caused by much valuable gaseous matter being decomposed. When retorts are worked at a low heat, carbon passes off with the vapours of hydrogen, and gas of high illuminating power is the result, rich in hydrocarbon vapours. As the temperature rises, more of the lighter gas passes off, and more carbon is left in the retort, and, as the heat is still increased, light carbide of hydrogen is evolved in large quantities, and a still larger amount of carbon is retained which permeates itself into the pores of the retort.

Olefiant gas, when passed through a vessel heated to redness, deposits carbon, and becomes a light carbide of hydrogen, or a light hydrocarbon gas, possessing but little illuminating power; so also is the case with ordinary coal-gas, or naphtha, when passed through a heated tube, depositing carbon under similar circumstances. It has been stated that when, by the deposit of carbon, olefiant gas is converted to light hydrocarbon, it is doubled in volume, and Dr. Fyfe, in doubting this, very justly states that, "though olefiant gas is not enlarged by depositing carbon, yet that olefiant, by acquiring hydrogen, is increased in bulk, and that when carbon is made to unite at first with a sufficient quantity of hydrogen, it gives double the volume of light hydrocarbon."

The carbon or carburet of iron found in iron retorts assumes a variety of forms of which some are very beautiful, and vary according to the quantity of iron and carbon present. This substance is also known under the name of graphite, and is used for the negative plates of voltaic batteries, as a substitute for platinum.

The simplest plan to be adopted for clearing off the carbon from the interior surface of the retorts, is to leave them open at both ends if possible, and uncharged for two or three days if necessary for the admission of a current of atmospheric air through them; the oxygen of the air causes the carbon to fall away from the sides of the retort, and to be partially consumed. A cold blast of air impinged on the surface of the retort through a wrought-iron tube will facilitate the operation, but this plan is liable to injure the retort. All the cracks and fissures that are left open and exposed by the process can be stopped with fire-clay carefully worked up and pointed: if this is well done, the leakage, which is always very great after scurfing, will, in some measure, be prevented. A mixture of tar and breeze is very effectual in stopping up the cracks, though, in most cases, they are at once charged after scurfing. If the first charge is allowed to remain in for twelve hours, little leakage is found to take place, especially after a few regular charges.

The scoop should always be used for charging, to save as much as possible of the first products of combustion, and which is of more importance to get an equal stratum of coal in the retort. The luting should be made of the refuse lime from the purifiers, mixed with a small quantity of fresh lime and fire-clay, and thoroughly

mixed and worked up with water, and laid evenly at a suitable thickness over cold lids.

As regards the temperature at which it is necessary to work clay retorts, Mr. Samuel Hughes, in his treatise on gas-works, gives the following table, extracted from M. Becquerel's *Traité de Physique*, which, I have little doubt, will be of some interest to some of my readers:—

	Degrees Fahr.
Faint red	960
Dull red	1290
Brilliant red (colour of red oxide of lead)	1470
Cherry red	1650
Bright cherry red	1800
Dull orange	2010
Bright orange	2190
White heat	2370
Bright white	2550
Brilliant white	2730
Melting point of cast-iron	2786
Greatest heat of iron Blast furnace	3300

The bright orange and the white heats are those generally used for clay retorts, and the cherry red for iron. Higher heats than these not only prove very destructive to the retorts, but cause an inferior quality of gas to be made, as previously stated. The formation of bisulphide of carbon greatly depends on the heat to which coals are exposed in distillation, as was shown in the evidence taken on the Metropolis Gas Bill, by a select committee of the House of Commons; and Dr. Frankland, in his "Treatise on Coal-Gas," published in Ure's "Dictionary," advises gas companies to prevent, as much as possible, the formation of this obnoxious compound, which he states as being irremoveable on a large scale by any practical mode of purification.

I will conclude this paper by a few observations on the fire-clay used for making gas-retorts and fire-bricks. The finest and purest fire-clays are found in the neighbourhood of the coal-measures, from which bricks, properly made, will stand the greatest heat possible to be put upon them: these are called the *slate-clays*, and they are found in large quantities at Newcastle, Stourbridge, North Wales, and Scotland. Fire-clays also occur in the same bed with ironstone. The number of different beds of clay found in England is very large, and they vary considerably in quality in different districts, having properties more or less adapted for the furnace, according to the absence of the alkaline earth and iron, and their freeness from the following impurities—oxides of iron and manganese, carbon, soda, and potash, and frequently lime and magnesia.

Clay is but a compound of silica and alumina; hence, from the union of these two simple earths, it is called a silicate of alumina. Silicate of alumina is the base of all natural clays, and the purer they are in these two substances, the greater is their commercial value. A compound of silica and clay, free from lime and magnesia, is found to be almost infusible in the strongest heat; while, on the other hand, clays that contain an excess of soda, potash, and limestone, melt in the furnace, and become fused into a kind of glass. Slate clay is of a grey or greyish yellow colour, soft and pleasant to the touch when ground; it is easily made plastic, and worked into a fine paste by the application of water. For the manufacture of bricks, &c., it is dug up in autumn, and exposed for a long time to the influence of frost and rain, and to the action of the atmosphere; it is also turned and worked over repeatedly, and cleaned from all stone and grit. The kneading or tempering, which is by far the most important part of the manufacture, reduces the clay to a ductile homogeneous paste, ready for the moulder's hands.

Clay retorts are usually made 3 inches in thickness, and 4 inches at the mouth-joints; and experience has proved that thinner retorts, made of fire-clay, are unadvisable under the present method of manufacture.

From the preceding observations, it will be seen that fire-bricks and retorts should be made of clay as pure, in silica and alumina, as possible, mixed with certain nice proportions of burnt stuff to counteract the tendency all clays have for shrinking in the furnace. An excellent plan of mixing up the carbon from old retorts has been adopted by retort-makers, as well as coating the interior surface by a composition of semi-enamel, to render it perfectly smooth, and to prevent leakage of gas, as well as to stop the too rapid formation of carbon. It is especially important to secure this fine and smooth hardened surface for the interior of the retort, free from all cracks and fissures, to prevent the filtration of gas through the pores of the clay. The value of a retort is as dependent on its finish and well baking as in the quality of the clay used. A good clay retort, well baked throughout, possesses a rich dark cream colour, and requires, as previously stated, well binding in and from each other and the sides of the oven. A practical method of testing the quality of a fire-brick is to place it either in the furnace or in a retort to observe whether it resists a great heat without slagging or vitrifying. Oxide of iron is perceptible in ordinary fire-bricks and retorts, if present in any quantity; the same plan is used for trying the fire-clay used for mortar. Oxide of iron colours all the clays deeply, and produces the bright red in common stocks.

The celebrated Stourbridge clay of Worcestershire consists generally of about 64 silica, 24 alumina, 2 oxide of iron, the rest water and other foreign matters; another analysis given of Stourbridge clay is as under:—

Water and organic matter	6·70
Silica	72·04
Alumina	18·79
Peroxide of iron	1·68
Lime	·69
Magnesia	·10

Other beds of fire-clay are now known, and are found to be as equally suited for the manufacture of fire goods as the Stourbridge clay. The following table shows the composition of various fire-clays, which are well known, extracted from Dr. Muspratt's new work on chemistry:—

	Stourbridge Clay.			*Monmouth.*	*Pembroke.*	*Govan.*
	Berthier.	Salvett.	Cowper.			
Silica	63·7	45·25	63·3	75·3	88·43	60·2
Alumina	20·7	28·77	25·3	16·8	6·90	37·7
Oxide of iron.	4·0	7·72	1·8	1·0	1·50	1·0
Lime	—	·47	1·5	·9	3·40	1·0
Magnesia	—	trace	—	—	trace	dry
Organic matter	10·3	17·34	10·3	6·0	dry	dry

The following is an analysis of the Perceton fire-clay of Scotland, used in the manufacture of gas-retorts, &c.:—

Silica	62·5
Alumina	35·0
Peroxide of iron	·9
Lime	·6
Magnesia	·3
Peroxide of manganese	·2
Phosphate of iron	·5

Dr. Richardson, in his analysis of the principal fire-clays found in the neighbourhood of Newcastle, gives the following:—

Silica	51·10	47·55	71·28	83·29
Alumina	31·35	29·50	17·75	8·10
Oxide of iron	4·63	9·13	2·43	1·88
Lime	1·46	1·34		2·99
Magnesia	1·54	0·71	2·30	
Water	10·47	12·01	6·94	3·64

The following is a recent analysis of fire-clays, received from a gentleman of great experience, expressly for the present publication:—

	Silica.	Alumina.	Potash.	Soda.	Carbonic Acid.	Magnesia.	Protoxide of Iron.	Peroxide of Iron.	Water Combined.	Water Hygroscopic.	Organic Matter.	
No. 1	63·30	23·30	..	..	0·73	..	1·80	..	..	10·30	..	Glass-house pot clay— Staffordshire.
2	45·27	28·77	..	..	0·47	..	7·72	..	..	17·34	..	
3	57·31	26·58	0·44	..	0·71	0·49	2·83	..	8·52	2·26	0·44	
4	47·29	33·07	2·13	..	0 45	1·06	..	2·52	9·07	2·19	2·53	South Wales.
5	67·12	21·18	2·02	..	0·32	0·84	..	1·85	4·82	1·39	0·90	
6	55·50	27·75	2·19	0·44	0·67	0·75	..	2·01	10·53	..	..	Northumberland.
7	66·16	22·64	..	..	1·42	..	5·31	..	3·14	..	..	Scotland.
8	46·38	38·04	..	..	1·20	..	1·04	..	13·57	..	..	
9	48·08	36·89	1·88	..	0·55	..	..	2·26	10·87	..	..	Derbyshire.
10	47·50	34·37	..	..	0·50	1·00	..	1·24	14·00	0·43	..	Hesse.
11	45·79	28·10	..	..	2·0	..	..	6·55	16·50	0·05	..	Bavaria.
12	66·10	19·80	..	..	..	..	..	..	6 30	7·50	..	France.

In my remarks on fire-clay, I have merely attempted to show what part it takes in the art of gas manufacture.

Multitudinous as are the forms under which it exists, and the important position it also occupies in forming other substances, the subject will be too vast to be attempted in a few pages.

Bath Gas-Works, Feb., 1862.

Register of New Patents.

2323.—GEORGE WHITE, of 7A, Pancras Lane, London, for "*Improvements in apparatus for filtering or purifying water.*" A communication. Patent dated Sept. 18, 1861.

The invention consists of making use for the filtering or purifying o water, solutions of acids, alkaline, or other substances, of thin porous filte ing partitions, formed of any suitable mineral, vegetable, or animal su b

stances, or combination of them according to the nature of the liquid to be filtered, which partitions may, for instance, be thin slips of natural or artificial filtering-stone, with or without carbon in its composition, a thin layer of a felted, woven, or any other suitable fabric or product, which slips or layers by their thinness would not offer sufficient resistance to the pressure exerted on them by the liquid, if they were not, according to this invention, carried, supported, and cemented, on proper frames, grates, or railings, forming casing for the apparatus, the said slips being further jointed together edgewise, in such a manner, that each filtering partition acts independently of the adjoining one, and may be thus caused to cease its filtration, or be altogether removed, and replaced by another one without interfering with the working of the remainder of the apparatus, whilst the said frames or grates are held together so as to constitute a strong casing for each apparatus, and make this latter form a polyhedral vessel, presenting a large amount of filtering surface comparatively to its bulk; the outside, or casing of each apparatus offering either an open or closed surface, with suitable exit-openings for the filtered liquid, according as is required.

2326.—Edward Alfred Cowper, of 35A, Great George Street, Westminster, Middlesex, for "*Improvements in apparatus for freeing gases from dust and other particles of matter floating therein, and for causing vapours or gases to be absorbed by liquids.*" Provisional protection only obtained. Dated Sept. 18, 1861.

These improvements relate to a means of separating particles of dust from gases of any kind, whether the same are in a pure or impure state, and consist in causing a large extent of surface, wetted with a liquid to be exposed to the gas in a finely-divided state, in such a manner that every minute portion of gas shall be brought into contact with such wetted surface, whilst, at the same time, any vapour or gas that is capable of being absorbed by the liquid shall be largely absorbed thereby.

In carrying out this invention, a cylinder is constructed of wire-gauze, or other material having fine openings, with several concentric cylinders of light material inside it, they being all closed at the ends, and the same are caused to revolve in the liquid in which it is partially immersed, with the axis in a horizontal position, so as to become wetted with the liquid, and then the gas which requires to be cleansed, or condensed, is passed into the inside cylinder and allowed to pass through the same and the other cylinders, to escape on the outside into a box or case which encloses the whole, and from which the gas is conducted when desired. Or, the whole is made of a conical form; or a number of discs of wire-gauze or other material having fine openings are placed inside a cylinder of metal or other material, and the gas is passed through from end to end in the direction of the axis of the cylinder, the same being partially immersed and caused to revolve in the liquid. Or, the cylinder is fixed, and the discs are allowed nearly to touch it, and caused to revolve without the cylinder.

In certain cases, where it is desirable to increase the draught or motion of the gas, an ordinary centrifugal fan is used to urge the gas through the apparatus, in which case diaphragms or screens of wire-gauze are sometimes fixed in a radial manner inside the fan-case, so that the gas may pass through them, the same being kept wetted with liquid supplied by pipes. Or, the plates of the fan itself are made in the same manner, and the liquid is applied on to them by pipes, or a number of large screens of wire-gauze are fixed in a box or case, and the gas is allowed to pass through them; the same being kept wetted with liquid supplied by pipes or thrown up by a small paddle-wheel revolving in the liquid lying in the bottom of the box or case. The screens may be placed horizontally; but, it is preferred to place them vertically, or at an incline, so that the dust, or other particles deposited on them, may be washed off by the liquid, and, in certain cases, a box or case is constructed with a number of such fixed and inclined screens, one above the other, making them alternately incline to the right and to the left, so that when the liquid is supplied on to the top screen, or shelf, it shall partly run across the screen as it runs through it, and shall thus wash off any dust into a pocket placed at the lowest side to receive it, which pocket is made deep enough to retain such deposit of dust, and yet allow of the liquid there collected, to overflow into the highest side of the next screen below, which is also provided with a like pocket, as are all the rest, so that, there being a proper plug-hole or opening to each pocket, it can be cleaned out of any deposit at any time without stopping the apparatus. Such an apparatus may be filled with coke, or breeze, or broken brick, or any material in small pieces that will not be affected by the liquid or gases used, so as to increase the surface to the gas; but such use of coke, breeze, or other material, forms no part of this invention, and is similar to what is commonly known in gas-works as the scrubber or breeze-washer. It is evident that a steam-jet or blast, like that used in locomotive engines, may be employed to urge the gas through the apparatus, or a number of fine jets of liquid may be used to urge the gas to a slight extent; or, a pump or a blowing-machine, formed of two or more gasholders rising and falling, may be used for the same purpose, or a spiral or a helical-shaped pipe made to revolve in liquid may be used, or any other description of blowing-machine may be employed to urge the gas through the apparatus. In certain cases where the gases are in a warm or hot state when they are required to be cleansed, it is preferred, in order to save liquid, to cool them to some extent by making the waste dirty liquid from the apparatus be supplied upon the outside of such pipes as bring the gas to the apparatus, so that a very considerable cooling effect may be produced by evaporation, after the manner of surface evaporatory condensers as now used for steam-engines by Mr. A. M. Perkins (patent dated September 21, 1858, No. 2124); and, in cases where it is wished to have the gas warm after the operation of cleansing has been performed, the pipe conveying the clean gas is passed through, or in contact with, the hot pipe, bringing the hot dirty gas to the apparatus so as to absorb heat therefrom, and, at the same time, cool the hot dirty gas to some extent. In cases in which the gas is very dirty, it is preferred to pass it first through a common scrubber, or a scrubber constructed as before mentioned, or through a box or case in which liquid is in violent agitation, in consequence of its entering by a jet or jets with considerable force, or is being stirred up either by a paddle-wheel or screw-propeller, or a pair of wheels or frames revolving in opposite directions, in the same manner as churners are now made, or by any other known means, so that a large portion of the dirt may be thus first deposited, and the gas is then passed through the apparatus, as before described. It is preferred to use the clean cold liquid first after this last part of the process, and then use it, secondly, for the first part of the process, and, lastly, to apply it, if necessary, on to the outside of the hot pipes which bring the hot gas to the apparatus, as before described. Different materials for the screens, shelves, cylinders, discs, and cones are used, according to the nature of the gases to be cleansed; and the proper liquid to be used in each case depends upon the result which it is desired to obtain. Such gas, when so cleansed, will burn with a clear flame without any deposit, and is perfectly well adapted for burning under boilers or in hot-water stoves.

2342.—John Hays Wilson, of the firm of John Hays Wilson and Co., of Liverpool, brassfounders and ships ironmongers, for "*Improvements in pumps, chiefly applicable to ships lift-pumps.*" Patent dated Sept. 19, 1861.

This invention is chiefly applicable to ships lift-pumps, and consists in placing the lower valve in a chamber on the head of the suction-pipe, and enclosing the top of the chamber with an air-tight cover, and constructing the working barrel on the side; a barrel with the chamber on the head of the suction-pipe and side-opening or pipe, being formed to connect the chamber on the head of the suction-pipe, at a point above the lower valve with the bottom of the working barrel, which is provided with an upper valve or bucket of a peculiar construction, and consists of an annular ring of cast metal forming the valve-seat, and having an arch springing therefrom, connecting it with the pump-rod. A cupped-lever is placed on the horizontal annular ring, which is kept in its place by a flat annular ring or washer, screwed on to the under side of the cupped-lever by headed screws which pass through the bottom of the cupped-lever, and are screwed into the under side of the valve-seat. The clack or cover of the valve is formed in the ordinary way, and the centre of the cupped-lever is removed to the extent of the valve-port. By this arrangement, a cheap and serviceable pump-bucket is obtained, as it requires little labour to fit, the side of the cupped-lever accommodating itself to any irregularity on the side of the casting forming the valve-seat. The lower valve is provided with a hollow screwed plug or vent, which has a lateral opening in the side about the middle of its length, the object being to admit air under the lower valve when it is desired to remove it for examination, repair or renewal, or for sounding the pump-well which can be readily done by removing the cover on the head of the chamber in which it is enclosed.

APPLICATIONS FOR LETTERS PATENT.

1128.—Richard Archibald Brooman, of 166, Fleet Street, London, E.C., patent agent, for "*Improvements in taps or valves.*" A communication. April 17, 1862.

1139.—John Shanks, of Barrhead, Renfrew, N.B., plumber, for "*Improvements in apparatus for promoting ventilation; also applicable to drying stoves.*" April 19, 1862.

1142.—Benjamin Rhodes, of Old Ford Road, Bow, London, E., for "*Improvements in the machinery for, and in the method of, making, as also in the materials to be employed in the manufacture of cylinders, tubes, and other vessels, from paper, and other materials or fabrics.*" April 19, 1862.

1146.—William Rose, of Halesowen, Worcestershire, manufacturer, for "*Improvements in the manufacture of tubes, more especially applicable to the barrels of firearms and ordnance.*" April 19, 1862.

1149.—Alexander Parkes, of Liverpool Street, Birmingham, for "*Improvements in surface-condensers.*" April 19, 1862.

1164.—James Chapman Amos, of the firm of Easton Amos and Sons, of the Grove, Southwark, London, S.E., engineer, for "*An improved mode of, and improvements in apparatus for, supplying surface-condensers with water, part of which improvements is applicable to blowers and rotary-pumps generally.*" April 21, 1862.

1165.—Christopher Crabb Creeke, of Bournemouth, Hants, architect and surveyor, for "*Improvements in the construction of drain, and other pipes.*" April 21, 1862.

1170.—Charles Webster, of Park Steps, Ilkeston Road, Radford, Nottinghamshire, locksmith, for "*Improvements in self-acting fountains, adapted for garden-engines, fire-engines, and for raising and forcing water from mines, wells, and other places.*" April 22, 1862.

1182.—Alexander Robertson, of 22, Bachelor's Walk, Dublin, surgical instrument maker, and Richard Barter, M.D., of St. Anne's, Blarney, Cork, for "*Improvements in apparatus for distributing and projecting fluids, either for surgical, sanitary, or domestic purposes.*" April 23, 1862.

1191.—John Endean, of Lock's Fields, Walworth, London, S., brassfounder, for "*Improvements in cocks, taps, and valves.*" April 24, 1862.

1195.—William Denny Ruck, of 8, Duke Street, Southwark, London, S.E., merchant, for "*The manufacture of grease from coal-tar, coal-oil, creosote, or dead oil.*" April 24, 1862.

1196.—John Wisborrow, of 4, Samson Terrace, Marlborough Road, Dalston, London, N.E., gas-meter maker, for "*Improvements in wet gas-meters.*" April 24, 1862.

1204.—Rudolf Zimara, of St. Peterburg, Russia, engineer, for "*Improvements in stoves for heating and ventilating buildings.*" April 24, 1862.

1224.—William Edward Newton, of 66, Chancery Lane, London, W.C., civil engineer, for "*Improvements in chimneys for lamps.*" A communication. April 25, 1862.

1231.—Squier Cheavin and George Cheavin, both of Boston, Lincolnshire, for "*Improvements in filtering and purifying water, and in apparatus employed therein.*" April 26, 1862.

1234.—Herbert William Hart, of Higher Broughton, Manchester, Lancashire, engineer, for "*Improvements in the manufacture of reflectors and shades for gas and other lights.*" April 26, 1862.

1256.—William Littell Tizard, of Mark Lane, London, E.C., engineer, for "*Improvements in heating, cooling, and condensing apparatuses.*" April 29, 1862.

1282.—Alfred Henry Fielden, of No. 35, Castle Street, Holborn, London, W.C., commercial traveller, for "*Improvements in show jars, lamps, signals, and lighthouses, and other methods of illumination, to be called the 'Rainbow light.'*" April 30, 1862.

1284.—Henry Willis, of Albany Street, Regent's Park, London, N.W., organ-builder, for "*Improvements in valves, for the supply and discharge of gaseous bodies.*" April 30, 1862.

1285.—William Edward Newton, of 66, Chancery Lane, London, W.C., civil engineer, for "*Improvements in lamps.*" A communication. April 30, 1862.

1288.—William Bickford Smith, of Camborne, Cornwall, merchant, and William Bennett, of Tucking Mill, Cornwall, engineer, for "*Improvements in the method of, and apparatus for, preventing the injurious effects occasioned by smoke, sulphur, and the deleterious gases which escape from stacks, chimneys, calcining-houses, chemical and other furnaces.*" May 1, 1862.

1289.—Charles Pierre Alexandre Douchain, of St. Cloud, France, engineer, for "*Improvements in apparatus for letting in, or shutting off, water or other liquids.*" May 1, 1862.

GRANTS OF PROVISIONAL PROTECTION.

360.—Gustav Lindemann, of Manchester, Lancashire, engineer, for "*Improvements in applying gas, for the purposes of singeing or dressing yarns or threads, and woven fabrics, and for obtaining heat for other purposes.*" Feb. 11, 1862.

967.—William Edward Newton, of the office for patents, 66, Chancery Lane, London, W.C., civil engineer, for "*Improvements in pumps for ships use, and other purposes.*" A communication. April 4, 1862.

969.—John Nock, and William Kirby Price, of Birmingham, Warwickshire, gas-stove manufacturers, for "*An improvement or improvements in gas cooking-ranges.*" April 4, 1862.

1017.—William Edward Newton, of the office for patents, 66, Chancery Lane, London, W.C., civil engineer, for "*An improved apparatus for raising and forcing water, and other liquids.*" A communication. April 9, 1862.

1021.—Daniel Fryer, of Carlton Square, Old Kent Road, London, S.E., and William James Williams, of Arundel Street, Strand, London, W.C., gentleman, for "*Improvements in the method of, and apparatus for, letting on and cutting off the supply of gas to groups or districts of street, and other lamps, from a central point or dépôt.*" April 10, 1862.

1040.—James Thomas Grice, of Birmingham, Warwickshire, tube-maker, for "*Improvements in the manufacture of twisted metallic tubes.*" April 11, 1862.

1059.—Archibald Samuels Campbell, of Hampstead, London, N.W., gentleman, for "*Improvements in surface-condensers.*" April 12, 1862.

1075.—Richard Archibald Brooman, of 166, Fleet Street, London, E.C., patent agent, for "*Improvements in pumps.*" A communication. April 14, 1862.

1128.—Richard Archibald Brooman, of 166, Fleet Street, London, E.C., patent agent, for "*Improvements in taps and valves.*" A communication. April 17, 1862.

1142.—Benjamin Rhodes, of Old Ford Road, Bow, London, E., for "*Improvements in the machinery for, and in the method of, making as also in the materials to be employed in the manufacture of cylinders, tubes, and other vessels from paper, and other materials or fabrics.*" April 19, 1862.

1146.—William Rose, of Halesowen, Worcestershire, manufacturer, for "*Improvements in the manufacture of tubes, more especially applicable to the barrels of fire-arms and ordnance.*" April 19, 1862.

1164.—James Chapman Amos, of the Grove, Southwark, London, S.E., engineer, for "*An improved mode of, and improvements in, apparatus for supplying surface-condensers with water, part of which improvements is applicable to blowers, and rotary pumps generally.*" April 21, 1862.

1165.—Christopher Crabb Creeke, of Bournemouth, Hants, architect and surveyor, for "*Improvements in the construction of drain, and other pipes.*" April 21, 1862.

1196.—John Winsborrow, of 4, Samson Terrace, Marlborough Road, Dalston, London, N.E., gas-meter maker, for "*Improvements in wet gas-meters.*" April 24, 1862.

1204.—Rudolf Zimara, of St. Petersburg, Russia, engineer, for "*Improvements in stovès for heating and ventilating buildings.*" April 24, 1862.

NOTICES TO PROCEED.

3123.—Stephen Barber Hewett, of Railway Cottage, Fairfield Road, Bow, London, E., engineer, for "*Improvements in the construction of boilers or generators for steam-engines, and other uses, applicable, also, to evaporators, and in pumps used therewith, or otherwise used, some of which improvements in pumps are applicable to pistons and piston-rods generally.*" Dec. 13, 1861.

3126.—Henry John Odling, of Smith Square, Westminster, London, S.W., engineer, for "*Improvements in the mode of, and apparatus for, feeding steam-boilers; also, in apparatus for supplying fluids for other purposes, and in apparatus for raising fluids.*" Dec. 13, 1861.

3167.—Samuel Sheppard, of Birmingham, Warwickshire, manufacturer, for "*A new or improved tap or stop-cock.*" Dec. 18, 1861.

3267.—William Spence, of 50, Chancery Lane, London, W.C., patent agent, for "*Improvements in deflectors for lamps.*" A communication. Dec. 31, 1861.

17.—John Jacob Gutknecht, of Neuhof, near Fizers, Switzerland, engineer, for "*Improvements in meters for measuring gas, water, and other fluids.*" Jan. 1, 1862.

70.—Alphonse René Le Mire de Normandy, of Odin Lodge, King's Road, Clapham Park, Surrey, analytical chemist, for "*An improved method of fixing tubes in tube-plates.*" Jan. 10, 1862.

635.—Francis Robert Newton, and Hiram Codd, both of Esher Street, Westminster, London, S.W., for "*An apparatus for indicating, and measuring the flow of liquids.*" March 8, 1862.

869.—Edmund Smith, of Hamburg, gas-meter manufacturer, for "*Improvements in wet gas-meters.*" March 28, 1862.

Parliamentary Intelligence.

HOUSE OF LORDS.

Tuesday, April 29, 1862.

The Woolwich, Plumstead, and Charlton, &c., Gas Bill was returned from the Commons, agreed to.

The Wakefield Water, the Windermere District Gas, the Bradford Corporation Water, and the Heckmondwike Gas Bills, were reported, with amendments.

Friday, May 2.

The Reading and Reading Union Gas Company's Bill was read a third time, passed, and sent to the Commons.

The Stretford Gas Bill was reported, with amendments.

HOUSE OF COMMONS.

Monday, April 28, 1862.

The Leeds New Gas Bill was read a second time, and committed.

Parochial Assessments Bill.—Petitions against the Bill were presented from the Stoke Fenton and Longton Gas Company, the Scarborough Gas Company, the Longton Gas Company, the Woolwich, Plumstead, and Charlton Consumers Gas Company; and seven others.

Tuesday, April 29.

The Dundee Water Bill was read a second time, and committed.

Two petitions were presented against the Highways Bill.

Parochial Assessments Bill.—Petitions against the Bill were presented from the Hebden Bridge Gas Company, the Hexham Gas Company, the Stockport Water-Works Company, the Wirral Water-Works Company, the Blackburn Water-Works Company, the Phœnix Gas Company, the Weymouth Water-Works Company; and three others.

Wednesday, April 30.

The Falmouth Water Bill was read a second time, and committed.

A petition was presented against the Highways Bill.

Parochial Assessments Bill.—Petitions against the Bill were presented from the Padiham Gas Company, the Yeovil Gas Company; and four others.

Thursday, May 1.

A petition was presented against the Highways Bill.

Parochial Assessments Bill.—Petitions against the Bill were presented from the Dukinfield Gas Company, the Isle of Thanet Gas Company; and another.

Friday, May 2.

Two petitions were presented against the Highways Bill.

Parochial Assessments Bill.—Petitions against the Bill were presented from the Warrington Water-Works Company, the Brighton and Hove Gas Company, the Guiseley Water-Works Company: and nine others.

HOUSE OF LORDS.

Tuesday, March 11.

(*Before the* Lord Chamberlain, *Chairman, the Marquis of* Sligo, *and Lords* Dartrey, Keane, *and* Silchester.)

BRISTOL WATER-WORKS BILL.

Sir Frederic Slade, Q.C., and Mr. Fry, appeared for the promoters: Mr. Denison, Q.C., and Mr. Venables, for the corporation of Bristol; Mr. Forsyth for Mr. Blagrave, of Barrow Court; and Mr. Milward for Sir Arthur Elton and the Clevedon Board of Health, petitioners against the Bill.

Sir F. Slade said, the object of the bill was to repeal and consolidate the Acts relating to the Bristol Water-Works Company, to empower the company to make fresh works, and for other purposes. He regretted exceedingly to find that the promoters were opposed in this measure; for he should be able to show that nothing was more imperatively requisite for the city of Bristol than the more efficient supply of water which the promoters were desirous to afford; and, therefore, in common justice and prudence, the matter should be conceded. The company was incorporated by an Act of Parliament in the year 1846, and their share capital was £200,000, with borrowing powers for £66,000; so that their lordships would observe that it was an undertaking of no inconsiderable magnitude. In 1850, the company came to Parliament, and obtained powers to raise £100,000 in preference shares, the capital then represented being £266,000. In 1853,the company came to Parliament, and again obtained borrowing powers to raise £34,000—making a total sum of £400,000. The whole of that sum had been expended in the works, *plus* £6000, which they were in-

debted to their bankers; and the committee would consider that it was not a very remunerative undertaking—though, unquestionably, the city of Bristol and adjacent districts had derived considerable benefit from it—when he stated that the company had divided on the original capital not quite 20s. per £100. Of course, the preference shares had their 5 per cent., and the per centage upon the money which had been borrowed had been paid; but the original shareholders, to the amount of £200,000, had never yet received 20s. in the £100. The object of the bill was to get more water, and to extend the operations of the company to certain parishes. Under their original powers given by the Act of 1846, which incorporated the company, they were empowered to construct works and everything necessary for supplying with water the city and county of Bristol; and the parishes of Bedminster, in the county of Somerset; and St. George and Westbury-upon-Tryme, in the county of Gloucester; and for compensating the owners of mills and lands upon the course of the streams the waters of which they were authorized to take. It was now proposed, by the present bill, to extend the limits of supply into the parishes of Brislington, Ashton, and Abbot's Leigh, in Somersetshire, and the parishes of Stapleton and Horfield, in Gloucestershire. He believed that the great struggle between the promoters and the corporation of Bristol would be, that his clients asked to be allowed to raise the present water-rates. The 66th section of the present bill contained a schedule of the rates by which the company were bound, under the Act of 1846, to supply their customers at. At the request of any owner or occupier of a private dwelling-house or part of a dwelling-house, in any public street or road, within the limits of the Act, in which, or within 100 yards of which, any main-pipe of the company was laid, they were bound to furnish a sufficient supply of water for domestic use, at annual rents or prices not exceeding those which followed. Then came a long schedule of prices, beginning with the rate to be charged when the annual rack-rent or value of the premises so supplied with water did not exceed £5—viz., 5s.—and going on *seriatim*, until it rose to a rent exceeding £200, for which the rate prescribed was £2. 10s. per £100 per annum. Then, there was a provision that for every water-closet or bath there should be paid the sum of not more than 10s. per annum. What the company desired by this bill to do was, to raise the water-rate in the high-level districts; or, in other words, to have power to charge more for the water which they pumped up. There was a peculiarity in the water supply of Bristol, as at present existing: for, by the Act of 1846, there was imposed upon the water-works company what had become a great source of waste, and to some extent a nuisance, the company being obliged to keep the water always on constant pressure; and the inhabitant of a house in Bristol or the neighbourhood, supplied with water from the company, might turn his tap, and the water would run as long as there was a drop in the reservoir. The result was, that the company, from the carelessness of some parties, and want of economy on the part of others, were constantly being imposed upon by an enormous waste of water. The learned counsel then pointed out the cost which the company incurred in raising the water to the high level of Clifton, by the construction of a reservoir on Durdham Down and other parts, and remarked that Clifton had now become a very large and growing place, and the houses were of great importance and considerable magnitude, inhabited by the more prosperous and wealthy classes of the city of Bristol; and the water-works company asked for permission to improve their Act of Parliament, to raise the rates on that part, and on that part only, where they incurred considerable expense in pumping the water up. That, he thought, it would be allowed, was somewhat reasonable, because the company had already incurred the expense of making that reservoir. Certainly, that ought to be no reason why they should be put in the unenviable position of clearing no more than 20s. for every £100 subscribed by the original shareholders. The proposition in the bill was to construct a storeage-reservoir on lands in the parishes of Barrow and Dundry, and also a compensation-reservoir at Barrow, with all the necessary mains, aqueducts, and pipes, for connecting these works with the existing works of the company. The opposition to the bill appeared to come, first, from Mr. Blagrave, who resided at Barrow, where the company proposed to construct their reservoirs; and, secondly, from Sir Arthur Elton, who was a landed proprietor on the banks of the river, some ten or twelve miles down towards the sea, and who, desiring at all times to be able to flush the river, objected to the company taking the particular stream which flowed into it which they included in their present scheme. By the existing Act, the company were required, as a compensation for the water which they diverted or used at Barrow, to let off from their reservoir, for the use of the mills and lands on and contiguous to the said brook or stream, a continuous supply of water, for twelve working hours a day, passing over a rectangular notch or gauge, two feet wide by three inches deep; and it was proposed by the present bill to increase that supply, by enlarging the notch six inches. The petition of Sir Arthur stated that the promoters sought to take water from the Elwell stream, &c.; and that, if that water, or any portion of it, was diverted from its present course, it would be a great prejudice to the inhabitants of the district. It also alleged that the bill contained no provision for protecting the interests of the petitioner. He (Sir F. Slade) had already read the clause which gave the petitioner an increased compensation to the extent of six inches; and, in reference to the general allegation, would only remind their lordships that no company could expect to furnish a supply of water to a great city or town unless they did take the streams in the neighbourhood. The water, the abstraction of which was complained of, came from heaven; and, if it were not collected by the promoters, would percolate through the soil, or form little rills down to the sea. He was satisfied the committee would feel that Sir Arthur Elton, and persons similarly situated, were amply protected by the provisions of this bill; and that, in point of fact, in dry seasons, they would be much better off than they had been. He now came to the third petition, which was one presented by the corporation of Bristol, and which he apprehended would be the *casus belli*. It stated that the petitioners had been for a long time the lords of the manor of the city of Bristol, and owners of the streets and ways. This was admitted; and there could be no question that they had a right to be heard here, with the greatest possible respect. They alleged that it was proposed to repeal the previous Acts of that company, to which the petitioners objected: and they asserted that many of the provisions of the bill would injuriously affect the inhabitants of Bristol. They then alleged that the passing of the first-recited Act was the result of a compromise between the company and the inhabitants, by which many advantages were secured to the latter. That might be, but it was absurd to say that those conditions were to be binding upon the company to the end of time. In 1846, the petitioners did not appear before Parliament as the corporation of Bristol, but as a board of merchant adventurers, promoting a bill of their own for the construction of water-works. The committee to whom the two bills were referred approved the scheme of the company, and rejected that of the merchant adventurers, who had no water to sell, and whose pipes were purchased by the present promoters for the sum of £18,000. The petitioners now stated that the company had acquired a virtual monopoly, which was injurious to the interests of the inhabitants. Now, this was not the fact; because, really, the company remained *in statu quo*, except that they now proposed to construct new reservoirs, and undertake other works, to afford the inhabitants a better supply of water. The petitioners alleged that they were apprehensive that, if the company extended their works to the outlying parishes stated in the bill, it would very much diminish and render unproductive the present supply; which, he said, was wrong, because it was the intention of the company to increase the extent of their reservoirs. They further complained that, by the bill, it was proposed to charge for the supply of water, above a certain level, an additional rate of 1½ per cent. upon the rack-rent, or value of such houses. Now, none of the parties to whom it was intended to extend that supply, opposed the bill; on the contrary, they regarded the proposal as a great boon. The company were willing to alter the words in the 67th clause—"Provided always, that if the dwelling-house so supplied, or the highest part thereof, is more than 200 feet above the soffit of the centre arch of Bristol Bridge," &c., to the following—"To any house to which the supply of water has to be pumped, the company may add to the water-rate payable in respect of the said house an additional sum at the rate of 1½ per cent. upon the annual rack-rent, or value of such house." The petitioners alleged that no such increased charge would be necessary, except for the unproductive districts proposed to be included in the bill. This, however, the evidence would show was not the fact. The company were now working unproductively, having an expense of £1500 a year for pumping water, which the increased rates they asked for power to charge would but just cover. They then alleged that there was a great waste of water, which might be economized. No doubt there was, from the circumstances to which he had alluded; but, under the provisions of this bill, the company would, in some measure, be able to check that waste, and then any fear of deficiency in the supply would vanish. The next objection was, that the promoters sought for powers to compel a supply by meter in some cases. Certainly, if they were now proposing to commence the supply of water in that district, this would not be regarded as by any means an unreasonable or unjust provision. In fact, it was a boon to those who took the water in that way, as they would only be charged for what they actually consumed. But, he would suggest to his learned friends who appeared for the corporation, that the company should give up this proposal, on condition that the higher rate for the district where the water was required to be pumped up was conceded. He would give up the clauses with reference to meters, and the charge for excess of supply, but must claim the right to punish for any wilful waste, to be ascertained by the company putting up a meter where necessary to test it, at their own expense.

Mr. DENISON said, the company ought certainly to be protected against wilful waste, but he thought some definite machinery should be provided for ascertaining it. Then the only question between them, if the company yielded the point about the meters, was as to the increased rates in the pumping districts.

After some further conversation on the point,

Mr. DENISON said, on the part of the corporation of Bristol, he conceded the principle of the company receiving increased rates for the high-level districts requiring pumping, but an increase of from 30 to 50 per cent. was enormous.

The CHAIRMAN: If the committee and the parties who oppose agree to the principle of the bill, it will only be for the promoters and the corporation of Bristol to settle matters of detail.

Ultimately, it was agreed upon that the increased rate of charges was to be confined to the pumping district, and was only to be 1 per cent. in advance of the other rates, instead of 1½ per cent. as prayed for in the bill; the charges for meter-rent to be abandoned by the promoters of the bill; the water-rates to be as prescribed in section 66 of the bill, with the addition of 1 per cent. on the pumping district; water to be supplied from 5 a.m. to 9 p.m. in summer, and from 6 a.m. to 9 p.m. in winter; the supply of water for domestic purposes during these hours to be unlimited; the company to have the power to put in a meter as tests where waste is suspected, but at their own expense. All the other arrangements, as proposed in the report of the parliamentary bills committee to the town council to stand.

The opposition of the corporation having been withdrawn, a long consultation took place between the counsel for the promoters and the remaining petitioners.

Mr. FORSYTH said he had been endeavouring to follow the good example set by the corporation of Bristol, and to arrange his opposition. He had agreed with the promoters of the bill, except upon one essential point, on which they were not likely to agree, and which their lordships would have the kindness to determine for them. He appeared for Mr. Blagrave, who opposed the bill on account of the damage caused to his property—as an owner of land and minerals—by the construction of reservoirs and the diversion of certain streams. The bill prayed for power to erect a new compensation-reservoir upon land of Mr. Blagrave, which compensation-reservoir would divert the course of the Dundry and Elwell stream, and prevent them flowing into the stream called the Barrow stream, which worked certain mills of which Mr. Blagrave was the proprietor. The bill provided compensation for that by a certain "notch" to be cut in the reservoir, by which a certain quantity of water would be caused to flow down the Barrow stream. A body of minerals was, however, known to exist within a certain distance of that spot, and it was intended by Mr. Blagrave to sink shafts in that very place, but, by reason of the proposed reservoir occupying the area intended to be used for that purpose, if he was right in the hypothesis that minerals were there, he must do so at a greater cost. He, therefore, asked for a clause providing for the appointment of an arbitrator by the Board of Trade to assess any damage which his client might sustain in consequence of this reservoir requiring him to sink a shaft at a greater distance, and at necessarily increased expense.

The Marquis of SLIGO asked whether it was intended that such arbitrator should now be appointed, or whether the provision was to be operative if, twenty years hence, Mr. Blagrave should think it right to sink a shaft?

Mr. FORSYTH said, he asked for it to be done now. If the arbitrator to be appointed should be satisfied that damage would be caused, or additional cost incurred, he would at once include it in his assessment.

Mr. FRY said, there was nothing in this case, which the Consolidation Acts, incorporated in this bill, did not make ample provision for. To introduce such a clause as was suggested, would be to give a foothold for litigation hereafter.

Mr. FORSYTH denied that the Consolidation Acts met his client's case, because no action would lie for necessitating the erection of a shaft further off than was otherwise necessary.

The CHAIRMAN said the committee saw no objection to the word "minerals" being added to the clause.

Mr. MILLWARD addressed the committee on behalf of Sir Arthur Elton, and the Clevedon local board. He said the original Act of the company comprehended a large supply of water for Bristol from the Mendip Hills, some fifteen or twenty miles from that city, by means of a line of pipes. By the proposed new works, the sources of water rising in the intermediate districts would be attracted to the company's reservoirs, and they would cut off the supply from the Elwell. The promoters professed to compensate for that loss; but he submitted that that proposal was insufficient. By clause 26 of the original Act, the Legislature provided that it should not be lawful for the company to take or interfere with any of the waters of the Elwell stream. The present bill was in direct contravention of that Act. He submitted further that Clevedon was now a very rising town, a large population had grown up and was increasing, and it was essential for the health of the district that that stream, into which a good deal of the sewage went, should be flushed, and, in order that the stream should be flushed, it was essential that they should have all the water that nature had provided for it. Clevedon wanted the whole of it, and objected to Bristol being helped out of her pockets.

Sir F. SLADE said the opposition of his learned friend did not appear to be against the preamble of the bill; it was a matter of clauses.

Mr. MILLWARD said he opposed that portion of the preamble which said that it was expedient further powers should be conferred upon the company. The clauses which went to carry out that part of the preamble should not be considered as assented to by the passing of the preamble in that form.

The following evidence was then given:—

James Simpson, Esq., examined by Sir F. SLADE.

I am a civil engineer, and have devoted my attention for many years to the supply of water to the great cities and towns of the kingdom. I am aware of the mode by which water is supplied to Bristol. The source is in the Chewton Mendip Hills. The first service reservoir is the Barrow reservoir, which is situated about six miles from the centre of the city. I am aware that the company by their present bill propose to enlarge their reservoir, which was designed by me. Up to this time, the reservoir is supplied by an aqueduct, which comes ten miles in a southern direction. The Elwell stream is entirely distinct from the existing supply, and, at present, is carried round the reservoir. In times of extraordinary drought, a pipe is put in to draw a supply from it; but practically it is not taken from the Elwell at all. It is proposed to collect water from that stream, and the Dundry, which, with the surplus from the existing reservoir, will supply the new one.

Sir F. SLADE: I suppose the use of the Elwell stream is a matter of necessity?

Mr. MILLWARD: I object to that question. You have done without the Elwell, since 1846.

Witness: It is very important to secure it. A large quantity of water frequently flows down that stream, and the fall being 200 feet in a mile, the water-shed is very quick; the stream is sometimes a torrent, and sometimes there is no water in it at all. The Dundry stream, I have never seen dry. It is proposed to collect the waters from it in the same reservoir. I have often had, under my consideration, the compensation which water companies give to the owners and proprietors on the banks of streams taken for water supply—it is one of the common sources of contention between them. We propose to give a gauge 2 feet 6 inches wide, by 3 inches deep. The quantity of water which would flow over such a notch would be equal practically to nearly 2-5ths of the stream, the usual compensation in such cases being 1s. 3d. This compensation will be given for 12 working hours per day in all weathers—wet or dry.

Sir F. SLADE: I ask you, as a practical man, is not that more than they would get from heaven?

Witness: At present, the stream is sometimes a torrent, and sometimes dry. In the case of the Cheadle Water Works, I know that the effect of such an arrangement, as is here proposed, was nearly to double the value of the stream as a motive power. I do not think Sir Arthur Elton, or the Clevedon board of health would be at all damaged by this scheme, because, in addition to the supply we give them, there is a large drainage below the point at which we touch the water. We have only power, so far as I have been able to investigate it, over 500 acres, but the drainage down to the point where the Elwell enters the channel, is 9550 acres, so that really we are only dealing with a nineteenth or twentieth of the whole. The volume of the Elwell and Dundry, which we propose to store up, is about 70,000 cubic feet per day. You cannot distinguish between the two. They get largely increased by foreign drainage, as they go down, which will remain untouched by these works, and, in addition to that, we give them 2-5ths of the whole volume of the water.

Cross-examined by Mr. MILLWARD: The gauge 2 feet 6 by 3, open for 12 working hours a day, will give 10,000 cubic feet. We propose this as compensation for the 70,000, but the latter includes the other stream. I know from visiting the place, as I have done once a month upon an average, for the last thirteen years, that the Elwell is sometimes dry. I believe the reservoir in the valley was constructed under the authority of the Act of 1846. Great pains have been taken to prevent the waters of the Elwell being intercepted, and conveyed into it. I know that Mr. Blagrave has complained of our doing so, and I directed the engineer to keep his eye upon the pipe to which I referred, and only to use it in case of great emergency. The intention of placing that pipe there, was that the works should not be under strain. I have never seen the Dundry dry, but I have seen it very small—something like the flow from a 2-inch pipe. Commonly speaking, it has a considerable run of water. It is ordinarily about 12 inches wide, and from ¾ to 1 inch deep. We only intercept the drainage of about 500 acres, but it is difficult to say what the amount of rainfall is. We get more water where the country is absorbent, but here it is not so; still, we do get great flushes of water. It is very desirable that we should secure all this for the supply of Bristol.

This was the case for the promoters.

Mr. MILLWARD said he would proceed at once to call his witnesses.

Mr. *George King*, examined by Mr. MILLWARD.

I am a miller, and reside at Tickenham, on the Elwell stream. I have had a mill there for twenty-seven years. Before the last two years, I suffered from want of water. I received from the Bristol Water-Works Company £20 a year as compensation for about nine years. If they stop the water, I cannot get on so well.

Cross-examined by Sir F. SLADE: I am a petitioner against this bill, and I have come here for Sir Arthur Elton. I was never up at Chewton Mendip, where the water-works are; I have been at the Barrow reservoir twice. At the time the company paid me £20 a year, they were not ready to give me compensation in water; they have since done so. They gave me notice that they should discontinue the payment, and supply the water. I cannot say how much comes from the Elwell, or from the Barrow, to my mill.

Mr. *James Wallace*, examined by Mr. MILLWARD.

I rent a farm under Sir Arthur Elton, and also occupy some land of my own. I reside at Clevedon. I know the Elwell stream as far up as Barrow. I do not think there is so much water coming down now as there was before the water-works were established; but I do not know the cause. In dry weather, the stream, as it flows through Clevedon, is not 2 feet deep. It was so about three years ago. I never knew it with so little water in it before the water-works were established.

Cross-examined by Sir F. SLADE: In wet weather, there is plenty of water always.

Mr. *Edward Candy*, examined by Mr. MILLWARD.

I reside in Clevedon, and am a general shopkeeper. I have lived in the town fifteen years. My house is about forty-five feet from the river; my premises run back to it. The water has been largely diminished in quantity since the Bristol Water-Works were opened, and I have seen quantities of animal and vegetable matter exposed to the atmosphere on the banks on either side, and there has been considerable effluvium. Before the water-works were made, the bed of the river was generally covered to the depth of twelve inches. I cannot speak from personal knowledge as to the source of the supply, but I believe that some of the streams now flow into the Barrow river which feed this stream, and, if they are cut off, we shall be very badly supplied with water. Five years ago, there were sixteen cases of death, and four of fever, in the short space of 100 feet of the river, and there have been recent cases in the immediate neighbourhood. I have had to get the obnoxious matter removed from the bed of the stream. I never had occasion to do so before the construction of the water-works.

Cross-examined by Sir F. SLADE: I am not a member of the board of health. Clevedon has been, for some years, rapidly increasing, and is a flourishing place. I am not aware that the local board have carried the sewage of the town into the river. The sewage of the town is, of course, increased of late years. The discharge from the sewers of the upper part of the town is carried into the sea. Some sewage goes into the stream.

Mr. *Frederic Gregory*, examined by Mr. MILLWARD.

I am by profession an engineer, and occupy a mill at Long Ash. I have known the Elwell down to Clevedon for the last eight years. When the company stopped the supply of water to my mill, they paid me £33. 10s. a year. I know what works it is now intended to construct. I have taken the measurement of the quantity of water in the district, and I do not think that the compensation which the company propose to give is anything like reasonable.

Cross-examined by Sir F. SLADE: I think that not less than 2 feet wide and 9 inches deep would be the thing. I measured the supply yesterday. The gauge was 3 feet wide and 3½ inches deep at the Barrow Reservoir, and there was another stream on the opposite side of the road, which will run into the proposed reservoir, and which we calculated would be 4 inches. I do not know how many gallons 2 feet by 9 would give; we go by depth. There was an overflow yesterday, from the Dundry and the Elwell. The previous day had been wet. There was not a great bye-wash from the reservoir; it was only about one or two drops a second when the wind blew over the pipe. After the company gave me a supply of water, they ceased to pay me the £33. 10s. per annum.

Mr. *Thomas Ward*, examined by Mr. MILLWARD.

I am a land-agent and surveyor in Bristol, and am well acquainted with the parish and district of Clevedon. I have been for many years land-agent to Sir Arthur Elton, who is the principal owner there and the lord of the manor. I have acted as surveyor and engineer to the local board of health. I have examined the extent of the streams which run through the flat land at the lower part of the parish to the sea. Clevedon is a watering-place on the Bristol Channel, and is increasing in population. The board of health was established there ten years ago. Since that time, the population of the upper village has increased very much; the lower village not so much so. The stream, after a fall of rain, is a considerable body of water, which cleanses the river. Its width is 18 feet, and it varies in depth according to the rainfall. There are 7 miles on the upper part of the stream. The board of works have not formed any sewer in the lower part of the parish. I prepared plans for the purpose seven or eight years ago, but it was not thought to be worth the expense. We must have taken the water out of the river to flush them. The principal source of water is the Elwell, which is fed by the Dundry, a stream at Barrow, and other smaller ones. It is essential to the town to have as much back-water preserved to it as possible. We are now only able to bring vessels into the river averaging from 24 to 36 tons, and, by taking off the supply of water, it will remove the swill which enables those vessels to come up from Wales with coals. In winter time, this will be a great inconvenience to the inhabitants. I was at the reservoir on Friday last, and found the stream, immediately after leaving the property of the company, 3 feet wide and 18 inches deep—that is, the brook itself. I also measured it under the turnpike-road; it was there 6 feet wide and 9 inches deep. The compensation-water supplied from the reservoir had then come in. I have measured the stream above the company's premises, and found that, at 10 chains from the reservoir, the Elwell was 3 feet 3 inches wide and 5 inches deep. I also measured the Dundry stream, and found it was 3 feet wide, and 3 inches deep. I account for the increased water by the many springs cropping out from the ground in that short distance. By the works now proposed, all those springs would be absorbed by the company, and the effect would be a great stagnation of water in the parish of Clevedon, causing an accumulation of drainage matter in the river, and promoting malaria and disease. It is essential for the health of the town that all the water we now have should be preserved. The average rainfall in the kingdom is 25 inches per annum; but this district, being a wide one, and the Dundry Hills attracting the clouds, the rainfall is above the average. I never knew the Dundry stream to be dry. The deprivation of the water which would take place by the construction of the works included by this bill, would have a bad effect upon Sir Arthur Elton's estate, which would not be compensated for by what the company propose to give. I think the stream would be too small to find its way, in a pure state, to Clevedon. The water for domestic purposes at Clevedon is generally supplied by wells, but the river is resorted to by the poorer classes; and it is used for cattle. Of late years, wells have been provided by the local board, in consequence of the impure state of the river, which is gradually getting worse.

By the CHAIRMAN: There are seven mills on the stream. They are, with one exception, corn-mills. Their tail-water is discharged into the river, but we do not find any impurity arising from the mills.

By Mr. MILLWARD: I believe the increasing impurity of the river arises from the diminished supply of water through the operations of the company. Some years ago, there were many cases of fever on the banks. The new part of Clevedon is not drained into the river, but by sewers, which discharge direct into the sea.

Cross-examined by Sir F. SLADE: I have known the district twenty years, and never saw the streams without water at the Barrow Reservoir. It is quite clear that the river at Clevedon, which is 18 feet wide, cannot be fed by the drainage of 500 acres alone. The proposed works of the company will take away that extent of drainage area, and all the springs in that portion. The depth of water at Clevedon is materially affected by the working of the mills.

Sir F. SLADE replied, and commented upon the fact that no engineering evidence had been produced by the opponents to prove that their apprehensions of injury by the projected works were well founded. In truth, the arrangement which the company proposed would be a boon to the petitioners, because it would give them constantly a larger supply of water than they could now obtain. The cutting off of 500 acres in a water-shed of 10,000 acres would, as regarded the petitioners, even without this liberal arrangement, be almost inappreciable; while the importance of making this additional provision for the better supply of Bristol had been proved to be very great.

The room was then cleared; and, after a lapse of ten minutes, the doors were again opened.

The CHAIRMAN said, the committee were of opinion that there was nothing against the preamble of the bill, but they thought there should be a greater compensation allowed under the 48th clause for water taken from the Elwell stream. They thought that the question of amount might be arranged between the parties.

Mr. MILLWARD said, he would rather it were not left in that way. He had tried to make such arrangements for years, but was always unsuccessful.

The CHAIRMAN said, perhaps, after the intimation of the committee, there would be no difficulty. Their lordships were not water engineers.

Mr. MILLWARD said, if the committee had considered it, they would perhaps say that it might be left to some eminent hydraulic engineer—say Mr. Hawksley—to fix the amount.

Lord DARTREY said, if the committee attempted to fix the amount, it must be entirely guess work. It was not possible for them to go into figures.

The CHAIRMAN said, Mr. Millward had not at all assisted the committee by calling engineering evidence before them.

Mr. MILLWARD said, it was not expected that the bill would come before their lordships so early in the session, or the petitioners might have provided such evidence.

The Marquis of SLIGO said, any expert in London would have given them a guide to go by in settling the point.

After some further conversation, the parties consulted, and Mr. FRY, then on behalf of the promoters, offered to give 12 inches by 3, instead of 6 inches by 3, for the water taken from Mr. Millward's clients.

Mr. MILLWARD objected that this was not sufficient. Mr. Simpson had said that it was not uncommon to give one-third of the ordinary supply. This, however, was an extraordinary state of things, and he thought the promoters ought to give one-half.

The CHAIRMAN said, the committee were disposed to agree to the proposition made by the promoters.

The clauses were then agreed to, and the bill passed.

Legal Intelligence.

COURT OF CHANCERY.

THURSDAY, APRIL 17.

(*Before the* LORD CHANCELLOR.)

HILLS *v.* THE LIVERPOOL UNITED GAS COMPANY.

This was an appeal from an order of Vice-Chancellor Wood, granting an injunction restraining the defendants from using their revivifying process, as being an infringement of the plaintiff's patent rights; and directing an issue to be tried by his honour, and a special jury, upon the question, whether the substance—bog-ochre—used by the defendants in the purification of gas, is a "precipitated oxide" within the meaning of that term as used in the plaintiff's patent.

Sir HUGH CAIRNS, and Mr. DRUCE, represented the appellants.

Mr. ROLT, Q.C., Mr. GROVE, Q.C. (of the common law bar), and Mr. MARTEN, appeared for the respondents.

The LORD CHANCELLOR (at the close of the respondents arguments) said: Before you reply, Sir Hugh, I will relieve you from one part of the order; and then I shall put it to both of you whether you can devise a mode of satisfactorily trying the question between you. Now, the order before me consists of two parts; one by which a particular issue is directed to be tried by the aid of a jury; the other by which an independent injunction has been granted, and that injunction, therefore, is granted as being matter of relief to which the plaintiff is entitled on grounds wholly independent of what may be the result of the trial of that issue. Now, the injunction is directed against the user by the defendants of what is called the revivifying process of the plaintiff's patent; and the injunction is founded upon this: that that revivifying process is an independent substantive invention, and an independent substantive part of the patent, wholly independent of, and disconnected with, the other portions of the patent. Consequently, it is contended that the process would be applicable to any material, whether that material be such as is described in the other part of the patent or not; and, on that view of the case, this independent injunction is granted. I am clearly of opinion that that is a misapprehension, and that I cannot maintain that order; though whether an injunction having the same result, but directed to a different object, ought or ought not to be granted, will require, perhaps, further discussion, and much consideration. But, with regard to the process of revivification, it is perfectly clear that it is stated and claimed by the plaintiff, duly with reference to certain definite things; and whether the material that is now used by the defendants be or be not one of those things is, by the first part of the order, made the subject of inquiry. If, therefore, the revivifying process is claimed only with reference to the purifying material described, and it cannot be predicated at present that the material used by the defendants is that purifying material, why, then it is plain that the injunction ought not to be granted. It therefore remains to be ascertained, on the face of this specification, whether the revivifying process is stated and claimed only with reference to a definite material. Now, on that I do not think any one can entertain any doubt. In the first place, the title of the patent as it originally stood was this: "An improved mode of compressing peat for making fuel or gas, and of manufacturing gas, and of obtaining certain substances applicable to the purifying of the same." That has been altered by the disclaimer, but it still remains a part of the original patent, and part of the original specification, which may be legitimately referred to, for the purpose of ascertaining the meaning of that which was originally written, in combination with that which has been now disclaimed, and struck out. Now, the plaintiff in his specification, as amended and corrected by the disclaimer, describes his invention to consist in the purification of gas, and also in renovating the material employed; that is, the definite material described by him for the purpose of that purification. Then, he goes on to state what that material is, including among others the hydrated or precipitated oxides, and he speaks of those as capable of forming the purifying material, when used for the purpose by themselves, without a combination with any other species of material. Then, he goes on to speak of this material. This material is to be put into a purifier. He then goes on, two or three lines lower down, to speak of certain gases which will be absorbed into the porous material. In the next page, at the second line, he says: "As soon as the material ceases to purify the gas." Two lines further down, he speaks of the purifying material. At the bottom of the page: "I prefer to effect the renovation, of the purifying material." Now the identity, the individuality of the purifying material is preserved throughout the specification, and is distinctly recognized by the plaintiff, in every line. Then, when he describes what he claims, he speaks of the purifying of coal-gas, "by passing it through the precipitated or hydrated oxides of iron by themselves, or which is much better, made into a more porous material." And the second part of the claim is: "repeatedly renovating or reoxidizing the said purifying materials by the action of the air." Now, it is that claim which points to the portion of the invention on which this injunction is granted. There can be no doubt whatever that the renovation, the operation described by him, is described and claimed with reference to the particular purifying materials which he has most carefully described, according to his apprehension of its language; for it is that purifying material which forms the first part of the alleged invention. The second is a process for operating on that particular purifying material, and restoring it when inert to the condition of its pristine efficacy. I have not the least doubt, therefore, that this injunction, treated as a thing which forms a substantive part of the patent, wholly independent of the inquiry what the purifying material is, and which is an order appended to an antecedent part, which makes it a subject of doubt and inquiry what is the purifying material, is an injunction founded upon a misapprehension of this patent, and that injunction therefore, I dissolve. But that leaves three very important questions, and those important questions I take to be these. Before I proceed to inquire what is the external substance designated and intended to be referred to by the words "precipitated oxide," I want to ascertain from the patent itself, as a question of legal construction, in what sense and meaning those words "precipitated oxides" are used; whether they are used in an universal sense without any limitation, or whether they are used in a sense narrower than their universal meaning, which narrowed and limited construction is put on the phrase by the operation of the context. That is the first question, and it is a question of legal construction, because, it being admitted and the basis of the argument that the material employed by the defendants is a native and not an artificial oxide, if the words "precipitated oxides," taken in the signification which they must bear from being read in connexion with the context, are to be regarded as denoting only a thing artificially prepared—that is, a thing resulting from the laws of nature, guided and directed by human agency—if that is to be the limited meaning, then there will be no longer any question to determine. But, if we arrive at the conclusion that we cannot, on a just interpretation of this specification, put on the term "precipitated oxides" any limited meaning, but that it means all oxides, whether prepared by the hand of nature, or obtained by the instrumentality of human agency, then will come this material question—namely, whether it is within human power, and within the reach of human testimony, to predicate of this particular material that it is a precipitated oxide? And, after we have discussed that question, there will then remain another, and a very material thing, which is this—supposing that the material used by the defendants be primarily a precipitated oxide. Suppose we cannot arrive at any certain testimony so as to be sure that we are right in giving it that denomination, then comes the question whether, after it has been used in the purification of coal-gas, it does not acquire the character of sulphuret of iron; and, if it acquires the character of sulphuret of iron, and is subjected to the revivifying process described in this patent, then arises the ulterior question, whether there is not produced by the application of this process of the plaintiff an artificial hydrated oxide within the meaning of that term "hydrated oxide," which we have already construed on the former occasion? Now, on those three points, Sir Hugh, I shall be glad to hear you; but, at the same time, it must be present to the minds of all of you that, as I am here on an interlocutory application, there can be no finality in any decision that I arrive at. Now, this order proposes to try this question by a jury. I cannot but think that excellent, as the instrumentality of a jury is for a great variety of purposes; it is but a course and somewhat unfitting instrument for solving a nice scientific question of this kind. I should be glad, therefore, to lend what aid I can to any mode of trying the question which you could both agree upon. My attention has been called to the circumstance that this patent has unquestionably been the subject of very long and expensive litigation. That is a subject to which I cannot legitimately refer for any purpose of decision; but I may legitimately refer to it for the purpose of expressing the anxiety I entertain to adopt any course consistent with the rule of the court, or, even if it be somewhat a departure from the *cursus curiæ*, if it be agreed by both parties that it would facilitate the trial of the remaining questions, I should advise then the postponement of the further argument. Perhaps there might be an examination of some of the scientific witnesses in court, in order to afford the defendants an opportunity of testing the accuracy of their reasoning, when they take upon themselves to affirm that this particular material could not have been produced in any other way than by that process of nature, which they describe as the only process that could lead to this result. Now, if you could agree on that, I would take any course for the purpose of cutting short the time and the expense of the litigation; if you cannot agree, I will hear the reply, and give judgment on those three points which I have mentioned. If I should come to the conclusion that this is, at all events, a sulphuret of iron, whatever in its primary state it ought properly to be called, that in its secondary state it is properly denominated a sulphuret of iron—if I should come to the conclusion that the application of the revivifying process brings it to the condition of a "hydrated oxide," within the meaning of that term contained in this specification, then it may be my duty to substitute a different injunction for that misapprehended injunction, as I humbly think, which is contained in this order.

Sir HUGH CAIRNS was then heard in reply.

The LORD CHANCELLOR: I am extremely unwilling, at all times, to press parties to adopt any other course than that which is the ordinary

course of the court. I shall not give the final judgment to-day, except that I dissolve the injunction granted by the Vice-Chancellor. That seems to be essential, because the six weeks have more than expired. In order to prevent any possible difficulty on the supposition that this cause, at the hearing, may be before one of the Vice-Chancellors, I direct that injunction to be dissolved, without prejudice to any question at the hearing. That is to prevent the possibility of my order being any embarrassment. Now, certainly, it is the rule of this court that in obtaining an injunction of this nature, on an interlocutory application, a clear case of infringement of the patent should be presented to the court. A clear case of the validity of this patent we undoubtedly have, because the patent has been finally established; but I cannot grant the injunction unless I have a case of infringement proved beyond any reasonable question. Supposing that I should discharge the whole of this order, the plaintiff might bring an action at law, and that would open another vista of litigation, from which he has but just escaped. He might not go to law; he might wait and bring on this cause for hearing again, and have evidence adduced at the trial, or, if he could agree with his adversary, without putting me to the necessity of disposing of this motion, as an interlocutory motion, it might be agreed between you to have the cause further heard as on final hearing, and to have scientific witnesses examined in court, going through the process that you would have to go through before a jury. That latter course I have no power to direct; it cannot be adopted unless you mutually agree upon it. I shall reserve my judgment upon the rest of this motion till Friday or Saturday next; but, if there should be any mutual agreement, and you will communicate to me the fact of the agreement, we will appoint an early day for the final hearing of the cause. If you wish that there should be a departure at all from the ordinary course of proceeding (sometimes, no doubt, it is very disadvantageous to do so) I have no wish except to be an auxiliary to an early, and, if I may say so, to an economical determination of the matter, if the parties should be willing to trust me with that determination.

Mr. GROVE: I can only say at once, on behalf of my client, that he is perfectly willing to adopt any course your lordship thinks most desirable for the pupose of bringing this matter shortly to an issue. As to your lordship's suggestion of having the question discussed as to the conversion into sulphuret or any other matter, which your lordship may think an important issue, tried before your lordship by the examination of witnesses, we should be quite ready to agree to that, or any other plan your lordship may suggest. We are anxious not to have the whole litigation reopened. We have succeeded so far that it has come only to this short, and, as I should have thought comparatively simple point; and we are perfectly willing to try it in any mode your lordship should suggest.

Sir HUGH CAIRNS: We will take care that your lordship's observations are laid before the company for whom I appear, but we are a company who must act by their board, and there is a board meeting on Friday, next week; therefore, I would ask your lordship if you would allow it to stand over till after that?

The LORD CHANCELLOR: I will not fix any day for judgment, but I will give it any day during term, unless I hear from you.

Mr. GROVE: Did your lordship say, that all you at present did was to dissolve the injunction, ordering an account?

The LORD CHANCELLOR: No, dissolve the injunction without prejudice to any questions at the hearing. If there are any books which one side or the other think it would be well for me to have, I should be very glad to have them before me.

COURT OF COMMON PLEAS.

WESTMINSTER, WEDNESDAY, APRIL 30.

(*Sittings in Banco, before Lord Chief Justice* ERLE, *Justice* WILLES, *Justice* BYLES, *and Justice* KEATING.)

HORTON *v.* MABON.

This action had been tried in the Court of Common Pleas at Guildhall, on the 14th of December last, before Lord Chief Justice Erle. It was an action for the infringement of the plaintiff's patent for "Improvements in the construction of gasholders." The defendant pleaded "Not Guilty," and a denial of the validity of the letters patent. The verdict was entered for the defendant, with leave to the plaintiff to move on the facts; and this motion was now made before their lordships.

Mr. BOVILL, Q.C., and Mr. WEBSTER, appeared for the plaintiff; and Mr. GROVE, Q.C., and Mr. HINDMARCH, Q.C., for the defendant.

Mr. BOVILL, by means of a model, pointed out the nature of the improvement which the plaintiff had invented, and which consisted in the application of double-angle, or trough-iron, in the formation of hydraulic cups to telescopic gasholders, for the purpose of rendering the joints air-tight and water-tight.

Lord Chief Justice ERLE said he had a distinct recollection of the case. The finding of the jury was, that as far as the application of the cup, in the shape described in the plaintiff's specification, to a gasholder was concerned, the plaintiff's invention was new at the date of his patent, but that the double-angle iron of commerce had been known for a period of years, and was applied to a variety of purposes in a curved form, as well as in a straight line. Upon that finding, a verdict was entered for the defendant, with liberty to the plaintiff to move.

Mr. GROVE said, that nothing on this occasion turned upon the evidence, but that there were three separate points for consideration. First of all, he contended, on the part of the defendant, that the invention, the nature of which he would presently explain, was not new, by reason of a prior publication of the sale and manufacture of the article by the plaintiff himself. This was one one of the points which had been reserved for the defendant, in case the verdict should be for the plaintiff. The second point reserved was, that a book had been published by Mr. Clegg, some years before the granting of the letters patent to the plaintiff, containing this invention. The third was, that the invention itself was not a fit subject for a patent, it being a mere publication of what had been used long before. Upon this latter point, the Lord Chief Justice had ruled in favour of the defendant, and the two other points were reserved. Now, the alleged patent was this: What were called telescopic gasholders were gasholders that sunk into each other in a particular form. Supposing these holders to be together, as the gas came from the retorts, it passes through the water, and causes the holder to rise in the cistern. Then, in order to get a greater supply of gas, there was an additional holder; and by this, and other means, a complete tank was filled. There was nothing new in that, nor was there anything new in the turning down of what was called the "rim" in the model, so as to form a water-tight joint. There was, then, a joint locking on to another one, so as to render the whole water-tight. That was not professed to be new; but what was said to be new in the plaintiff's patent was the "rim" in question. This rim had generally been made of what was called angle iron riveted to a plate; and, instead of having two pieces riveted in order to form the cup, the plaintiff claimed to have substituted a new invention by having formed them of one piece of double-angle iron. On the trial at Guildhall, it did not seem to be of much importance whether the cups were turned up or turned down, but it was admitted that double-angle iron had been heretofore applied to a variety of purposes. What the plaintiff alleged was, that he had applied it for the first time to the making of the cups, and that he had thereby saved the expense of riveting and of having separate pieces. The specification was as follows:—"My third improvement consists in forming the top and bottom of the water-cup or hydraulic-joint of gasholders of sheet or plate iron, wrought to the shape required for such parts, instead of using angle iron and sheet iron, bolted or riveted together, which renders the manufacture more costly." The question which arose out of this was, whether the plaintiff claimed that he had turned up the rim of the gasholder with plate iron? If so, then the defendant had not infringed, because what the latter did was to make use of the double-angle iron of commerce. But, to make out any case against the defendant, the plaintiff was bound to contend that whatever the defendant did must have had the adoption of the double-angle iron in view. Now, in page 4, line 25, he went on to say: "Instead of forming the cup or valve of sheet or plate iron, with angle-iron at the corners, as in the ordinary mode, I make a cup of wrought iron, and secure it on one side by rivets to the gasholder, and, on the other side, in a similar manner, to a strip of sheet or plate iron, in order to form the other side of the cup or valve. By this means, as the rivets on the top and bottom of the cups are dispensed with, and only one row of rivets on each side is required, a great economy in the construction of gasholders is effected." Then he went on to add: "For the mode herein shown and described, of constructing the hydraulic cups or joints of gasholders, or any other modification thereof, in which the top or bottom of the hydraulic joint or valve is formed of plates of iron, made or bent into a cup shape, so as to admit of the valve being made complete, and attached to the gasholder, without the necessity of employing angle iron and double sets of rivets, as is usually the case." Their lordships would see that, if this specification were adhered to, the plate would be bent into a cup shape; and, if that were the claim set up by the plaintiff, then clearly there had been no infringement whatever on the part of the defendant; but then the plaintiff claimed because of double-angle iron having been used, to which the defendant replied that that description of iron was *ex concessis*, an old and well known description of iron, used for various purposes. It was indeed asserted by the plaintiff's witnesses that double-angle iron could not be bent, but that had been most satisfactorily answered by the witnesses for the defendant, who proved that it was commonly used for ships coating, for troughs, reservoirs, and other like purposes. The curve was very slight, and often it was formed of pieces of a yard in length.

Justice BYLES: These gas-tanks are very large, are they not?

Mr. GROVE replied that they were—so much so, that the curve would be hardly visible to an ordinary spectator. In fact, to the unpractised eye, it would assume the appearance of a straight line. The witnesses said it would be very slightly curved, and the jury agreed with the Lord Chief Justice that double-angle iron had been applied for years to a variety of purposes in a curved form, as well as in a straight line. Then, what was the plaintiff's invention? Admitting that double-angle iron had been his invention in the making of these cups, that iron was perfectly well-known long before, and had been used for a variety of purposes, so much so that even the learned counsel for the plaintiff, Mr. Bovill, declined to argue that point. Cisterns were mentioned; several other purposes to which it had been rendered applicable were also mentioned; and then it was admitted on all hands that double-angle iron was a thing well-known and long in use, although it might be that it had not been applied perhaps to gasometers previously; but, whether that was so or not, Mr. Bovill clearly acknowledged its general use.

Mr. BOVILL said his learned friend was straining his admissions much beyond their actual length.

Lord Chief Justice ERLE said that, whatever Mr. Bovill might have admitted, one thing was perfectly clear—that the jury found that double-angle iron had been in use for a variety of purposes for years. Without now going into the evidence, it was sufficient to say that the jury found that "double-angle iron of commerce had been known for a period of years, and had been applied to a variety of purposes in a curved form, as well as in a straight line."

Mr. GROVE said he was prepared upon the trial to prove, if necessary, that it had been so applied; but he was stopped from examining witnesses to that effect by the admission of Mr. Bovill.

Mr. BOVILL said that, whatever his admissions might have been, one thing was very certain—that it was proved beyond all doubt that the double-angle iron had never before the plaintiff's time been applied to gasholders.

Lord Chief Justice ERLE: Oh; that was plain throughout the whole case.

Mr. GROVE: Yes; I myself admitted it as a fact that this principle had never been applied to gasholders before.

Lord Chief Justice ERLE: Upon that point, there can be no mistake; it was admitted throughout the whole case.

Mr. BOVILL: No doubt, that is so; there was no proof it had ever been applied to gasholders. But, I think, there was no evidence it had ever been applied to reservoirs.

Mr. GROVE referred to a passage in the address of the learned judge to the jury, in which he distinctly stated that it had been used for reservoirs. There was no doubt upon the trial that it was not a new invention. When examining upon that point, Mr. Bovill clearly and unmistakeably said, that he would not cross-examine upon it—that he was perfectly satisfied upon the subject. Mr. Hindmarch, for instance, asked a question of one witness: if it had not been applied to a great variety of purposes, whereupon, Mr. Bovill immediately said, "No, I do not dispute that; I do not examine upon it." There was abundant evidence to show that it had been applied to a great variety of purposes, and, in truth, that it might have been used for a variety of purposes analogous to those of gasometers, and things of the same sort.

Mr. BOVILL: No; not of the same sort. If you will read any passage in which I ever admitted it had been applied to things of the same sort, I will admit it. There was the evidence of Mr. Cowper, who said—

Mr. GROVE: I repeat that, when we were going into this particular part of the case, we were stopped by my learned friend, who distinctly declared that he would not cross-examine upon that. We had the most distinct evidence in favour of the fact, but he interposed, got up, and stopped us in the middle of it. I assert again that we were going distinctly and elaborately into it when he stopped us. I will read the evidence of Mr. Cowper, and then your lordships will see that there is no doubt whatever about the point. Mr. Cowper says—"I am acquainted with the construction of gasholders, and am familiar with double-angle iron, which I have used in many cases, long before the date of the plaintiff's patent. It was

used for a variety of purposes—very commonly for roofing. I have used it curved. When it comes through the rollers red hot, it is laid down upon a curved block of iron and hammered, which is the most economical mode of curving it. There would be no substantial difficulty in curving it, if the side were prolonged to 12 inches. It would require a larger furnace and a little more labour; but, it is perfectly feasible. We bend much larger pieces of iron than that. The difficulty chiefly arises from the iron having to be made larger on the outside than the inside, so that the outside has to be stretched. But the amount of curvature here is very slight. There is nothing in the plaintiff's specification which indicates that the curving is any part of his patent; the language would cover both curved and straight plates. I have read the portion of Clegg's book referred to, and the impression it made on my mind was, that there was an end of this case, because double-angle iron is shown there to all intents and purposes." Your lordships will observe that here the question is, whether it was used before in the curved or plain form?

Justice BYLES: What did Mr. Cowper say as to its being used in the curved form?

Mr. GROVE: He says he had used it curved. The only point denied by the plaintiff was, that it had been used in the curved form. To refute that, we called Mr. Cowper and Mr. Bramwell, both of whom proved that it had been used before in that form. Just following this is a passage by my lord, in which he says, "the claim would be a good one in point of law, if the invention were not known before, but Mr. Cowper says there was no difficulty in curving it." But, as I said before, Mr. Bovill did not dispute that it had been applied to reservoirs and other purposes.

Mr. BOVILL: You will see, afterwards, that I moderated that admission.

Mr. GROVE: Here are the shorthand writer's notes, in which you say, at folio 86, that you would not cross-examine upon that point.

Mr. BOVILL: In re-examination, you proposed to examine about the curve, and I objected to that.

Mr. GROVE: I beg my learned friend's pardon. It was not upon the re-examination; it was upon the examination in chief. He is now going to contend that the double-angle iron was not used for any analogous or cognate purpose, but, he ought to know that he distinctly prevented me from going into that subject.

Justice WILLES: Is this a patent for making a thing in one piece instead of many?

Mr. GROVE: Yes; but there must be some new invention introduced in order to entitle you to obtain a patent. If a new form of handle for a door, for instance, were invented, it would be no invention if the same had been applied to windows before.

Justice BYLES: But there would be invention?

Mr. GROVE: No doubt, it would involve invention and some difficulty; but then my learned friend, Mr. Bovill, failed in establishing that there had been either.

Justice BYLES: There was a very important case in chambers, bearing on this point.

Mr. GROVE: There was, my lord; I have got it before me.

Justice WILLES: Then, there was the case of the fishing strip—one very important as bearing on the present case; although, of course, it was different to having one piece instead of three.

Mr. GROVE: The fishing case, my lord, was not only new in fact, but new in nature.

Justice WILLES: Besides that, there may be something different in this case from what was in the other.

Mr. GROVE: There is not only one piece here, instead of two or three, but there is the making of that one piece into purposes of a cognate character.

Justice WILLES: I am assuming that Mr. Bovill is right, and that you are wrong; and, supposing that you are wrong, that it had been applied to other purposes before—in that case, then, it is a weaker one than that of the fishes.

Mr. GROVE: But the argument of my learned friend would entitle a carpenter to a patent for making doors, if he dovetailed instead of nailed them, or made them better than they were before, at a lesser expense.

Justice WILLES: Yes; at a lesser expense.

Mr. GROVE: Yes, my lord; that depending upon the commercial state of manufacture at the time. A man is not to take out a patent because the iron manufacture has got to that pitch, that single-angle iron is useful for every purpose. Suppose single-angle iron is commonly in use, and double-angle is afterwards introduced, is a man to take out a patent for that? And yet this is assuming the case of Mr. Bovill; for the fact is clear as possible that this double-angle iron was used for similar purposes before, and that we were stopped in the course of our examination at the time we were proving by our witnesses that it had been repeatedly used for straight and curved purposes. He does not claim for a mode of making this new cup at a cheaper rate. He merely claims for the application of this sort of bent iron. It was no part of our contest to show that certain advantages were not obtainable by this double-angle iron principle. We admitted that we were using it for gasholders; and I will assume that it is cheaper than the single-angle iron. [The learned gentleman here referred to the evidence given by the plaintiff on the trial, and said he would refer to one or two cases bearing on the evidence and the facts.]

Lord Chief Justice ERLE: Then that is the view you take of the facts?

Mr. GROVE: Yes.

Lord Chief Justice ERLE: And of the law?

Mr. GROVE: Yes.

Lord Chief Justice ERLE: And is there nothing more specific you can offer than has been offered already by Justice Willes?

Mr. GROVE: No; I do not know that there is, my lord. There is a case of *Bush v. Ashton*. There was some modification in that, but it was not material. It was a case of machinery, said to have been applied to a different purpose from its original intention. There was also the case of *Harwood v. the Great Northern Railway*, and *The Queen v. Norway*. The case of *The Queen v. Cutler* was not unimportant. That was a case of coated tubes for tubular boilers, and there Lord Denman said that he had no right to a patent, inasmuch as coated tubes were not new. Mr. Justice Wightman laid down the same rule, and the verdict was for the crown.

Lord Chief Justice ERLE: We have the case of *Harwood v. the Great Northern Railway* before us, and will, therefore, not ask you to enter into it. We shall hear Mr. Bovill at present, in order to see what new light can be thrown upon the plaintiff's case, after which, if necessary, we shall call upon Mr. Hindmarch to reply.

Mr. BOVILL said, the patent in the present case, had turned out to be a very valuable invention, because in every gasholder now made it effected a saving of £100. At the time of the invention, it had never occurred to anybody to manufacture a gasholder in the way the plaintiff had manufactured it. Down to the time of the plaintiff's patent, the only mode by which any persons had been able to form gasholders with water-tight joints, was by having by the side of the gasholder a plate of iron running round it, and then by connecting the bottom by two single-angle irons it was done under the former plan. His client had undoubtedly invented a new article, whereby the mode of making it could be obtained in a cheaper and better manner. Instead of having a plate of iron which had to be riveted to two angle irons, he had invented a plate of iron which was formed with grooved sides, and that he riveted at once to the side of the gasholder, and the plates he fastened to the lip of the cup; and thus he got rid immediately by that mode of constructing his gasholder with two rows of rivets round its entire circumference. In other words, in the place of two rows of rivets which had to be introduced before, only one row was now required. The plan formerly adopted was to fit the cup to the gasholder by means of two angle irons and a plate, as shown in the model, and there were thus three pieces of iron which had to be riveted as described. Instead of that, the plaintiff constructed a simple piece of metal, instead of three pieces, and thus accomplished the desired object. The effect was really most beneficial; so much so, that, when he took out his patent, the defendant immediately adopted the invention, seeing that it would effect a saving of £100. The question was, whether such a valuable invention was not the subject matter of a patent? No doubt the plaintiff was using double-angle iron—a material previously in use—but still he was not using it in the sense of strengthening the plate: in reality, his invention was a substitution of another material, and an improved mode of construction. The beneficial results of the patent, so far as the public were concerned who had to buy gasholders, was unquestionable. Why, then, should not the invention be the subject of a patent? In every mechanical invention brought before the courts, and that was made the subject of a patent, what did the party do? Supposing a man substituted a lever for a cam, or a cam for a lever, neither of these things was new, but the substitution might be attended with the most beneficial results. If, for instance, it effected an improvement in mill machinery, if it dispensed with three wheels by the substitution of a simple cog-wheel, then, although nobody would pretend that the lever had not been used before either vertically or horizontally, yet the fact of the improvement effected by the substitution would be indubitable. This was a principle common to all machinery. The beauty of an invention depended upon simplifying its parts, and producing a cheaper article, and one beneficial in its results. Undoubtedly, an improvement was effected by substituting one cog-wheel for three levers, or one lever for three cog-wheels. The application of the principle consisted in the substitution of mechanical implements to purposes to which they had never been applied before. Now, in no single respect did the use and application of the double-angle iron to a gasholder differ from the principle he was here laying down. To take a familiar illustration—it was known perfectly well before Watts's time that steam might be condensed by cold water. Prior to his time, the steam was condensed in the cylinder itself. He set about making an improvement, and he condensed it in a simpler form. His principle was not exactly new, because it was previously known that steam might be condensed in a variety of vessels, but then it was the simple application of a well-known expedient to produce a better result.

Justice WILLES: You merely make the instrument cheaper for producing the same effect. A claims the application of the double-angle iron to the cup. B applies the principle, and so gets the benefit of A's invention. That seems to be your case?

Mr. BOVILL: Precisely so.

Justice WILLES: But the principle was known before.

Mr. BOVILL: The same thing might be said with regard to the condenser.

Justice WILLES: Yes; a person makes, by a simple process, a thing applicable to that of the angle iron to the cup. Immediately it is made, it is adopted. It is a thing that anybody might have used. A carpenter, for instance, might use a piece of deal in one way, so might another carpenter use it in another form. Deal is applicable to a variety of purposes; but it does not follow that because one man applies it in a particular way, that he has thereby made an invention entitling him to a patent.

Mr. BOVILL: But, then, my case is that, until the plaintiff's time, this improvement had never been made.

Justice WILLES: Yes; but then you put it upon the ground of the cheapness effected. This, however, is not a cheapness in the entire contrivance; it is a cheapness in the price of the article when constructed.

Mr. BOVILL: Allow me, my lord, to put the case thus: Two levers will produce the same result; but, then, if a cheaper machinery be introduced, and that one lever can be substituted for two, of course, an important result has been effected. But, then, nobody has ever done it; nobody has ever thought of it before the plaintiff's time.

Justice WILLES: That may be a disputed idea.

Mr. BOVILL: But, if there be any difficulty in applying the principle to the case of gasholders, allow me to call your lordship's attention to the rule laid down by Chief Justice Tindall, in the case of *Crane v. Vice*, with reference to the hot-blast.

Lord Chief Justice ERLE: The hot-blast and stone-coal were well-known before.

Justice WILLES: That was a case in which a certain material had been applied in a manner cheaper than it had been before. The material had been used, in fact, over and over again.

Lord Chief Justice ERLE: Here your main point seems to be that you have reduced the cost by £100 in the construction of the gasometer.

Mr. BOVILL referred again to the judgment of Chief Justice Tindall in the case of *Crane v. Vice*, where, for analogous and cognate purposes to the present, the patent was granted. The learned counsel next referred to the cases of *Russell v. Cowley*, *Steiner v. Heals* (6th Exchequer Reports, page 607), *Booth v. Kennard* (1st Houston and Norman, page 527), and *Harwood v. the Great Northern*, and concluded by contending that the plaintiff's was a most valuable patent.

Mr. WEBSTER followed on the same side.

Lord Chief Justice ERLE, without calling on Mr. Hindmarch to reply, delivered judgment: He said the court was of opinion that the rule must be discharged. The whole of the claim consisted in the application of an old instrument to a purpose analogous to the purposes to which it had been before applied. The claim was for a patent for the application of double-angle iron for constructing the cups of telescopic gasholders. A telescopic gasholder was perfectly well known, and so was a water-joint. The person who constructed the water-joint gasholder had been guilty of the blunder of constructing the gutter in intermediate pieces by means of two single-angle irons. It was subsequently found that the double-angle iron would answer all purposes of the gutter, and be attended with all the advantage of saving two lines of rivets. The whole invention consisted in the adoption of the double-angle iron. It appeared to him that the double-angle iron was well-known before, and that the saving of the rivets, and of labour, and expense, did not furnish

sufficient grounds for the granting of a patent, because it was the application of a thing to purposes to which it was before applied. He would not go into any of the cases which had been cited, because this had not been the production of an improved product, but simply a mode of making the gutter at a cheaper rate; and that was not the subject of a patent.

The other judges concurred in the view expressed by the Lord Chief Justice.

Mr. GROVE said there were two other points, and he wished to mention them, in case his learned friend, Mr. Bovill, desired to appeal.

Lord Chief Justice ERLE said that if Mr. Bovill was dissatisfied with the judgment, he might take the case to the Exchequer Chamber, where the two other points mentioned by Mr. Grove would be argued.

DUBLIN POLICE COURT.

FRIDAY, APRIL 25.

(*Before Messrs.* STRONGE *and* ALLEN, *Presiding Magistrates.*)

THE HIBERNIAN GAS COMPANY *v.* MICHAEL STAUNTON, COLLECTOR-GENERAL OF RATES.

THE ALLIANCE CONSUMERS GAS COMPANY *v.* THE SAME.

These were appeal cases, in which the companies respectively alleged that they had been incorrectly, unequally, and unfairly assessed.

Mr. COFFEY (instructed by Mr. J. M. Cantwell) appeared for the companies; Mr. BARRY, Q.C. (instructed by Mr. Mooney), on behalf of the collector-general; and Mr. OWEN (instructed by Mr. Bolton) attended to watch the proceedings, on the part of the commissioners of valuation.

Mr. COFFEY said that, in the case of the Hibernian Gas Company, a summons had been taken out against Michael Staunton, Esq., the collector-general of rates for the City of Dublin, calling on him to show cause why the rate applotted or assessed by him, pursuant to the Statute, 12 and 13 Vict., c. 91, and the other Acts incorporated therewith, in respect to property described as "gas-works, and buildings, and the lands used and occupied thereby, and therewith, in the south city electoral division, and the right and easement of using and occupying lands, by and with the said gas-works, should not be amended, reduced, or varied; or why these should not be expunged from the said rate, or charge, or applotment, in respect to the several taxes described by the said rate as being incorrect, unequal, and unfair in the valuation of the property mentioned therein." The summons in the case of the Alliance Company was in the same terms.

Mr. BARRY said, before the case was proceeded with, he had a preliminary objection to take. He submitted that, in point of fact, the bench had no jurisdiction in the matter, and could not entertain the case.

Mr. COFFEY thought, that in an important case of this kind, especially where there was no appeal from the decision of the bench, whose decree was final in the matter, a technical objection should not be raised.

Mr. BARRY contended that the objection was not technical. The collector-general was a public officer, and had no power to waive the question of jurisdiction.

Mr. STRONGE (magistrate) said he did not think that even consent would give the court jurisdiction unless the bench had it under the Act of Parliament. At all events, the question of jurisdiction must be first gone into.

Mr. BARRY said, the point he submitted, and upon which he should contend the court had no jurisdiction was this, that the appeal of the company was not made within thirty days prescribed for that purpose by the Act of Parliament. That being established, the bench could not entertain the case.

Mr. COFFEY, in reference to the question of jurisdiction, said, that under the 67th section of the Act 12 and 13 Vict., cap. 91, any person aggrieved by the rate imposed, on the ground of inequality, unfairness or incorrectness, had the right of appeal within thirty days from notice of the rate on the divisional justices, having previously served the proper notice on the collector-general, and entered into recognizances to prosecute the appeal. In the present case, the Hibernian Gas Company felt themselves aggrieved by the assessment, and they had appealed within the thirty days from the notice being served upon them to pay the amount of the assessment. He contended that the demand for payment signed by the collector-general and served on the company, on the 20th of March last, should be taken as the first notice of the applotment, and that from that date, the thirty days allowed for appeal were to run.

Mr. BARRY said, the question was too plain for argument. The collector-general was the public officer of the citizens, and could not help doing his duty. In this case, it was his duty to make the assessment now appealed against by the Hibernian Gas Company. There was no ground for supporting the contention that the demand for payment was "the notice of applotment." The legal notice intended by the Act of Parliament, was the publication of the advertisement of the poundage rates struck in respect to the different taxes, as required by the Statute, in the *Dublin Gazette*, and in two of the public newspapers of the city. That notice was duly published on the 1st of January last, and the time for the company to appeal ran from that date. He was instructed also that notice of the revised valuation and assessment had been served upon the gas companies in due time for appeal.

Mr. COFFEY said, he was instructed that such was not the case. The notice served was the usual one. For several years prior to 1862, the gas company had only been assessed upon their valuation for poor-rates and for no other rates. The company did not appeal against the valuation, although they thought it rather high, but against the application of that valuation to the several rates in question.

Mr. BARRY said, he was informed that the gas companies were apprised of their altered position in due time for appeal. He repeated that the collector-general, when once the valuation was sent in, had no option but to assess the gas companies in the manner that he had done. He submitted to the bench that, upon the Statute, it was clear the time for appeal had lapsed. He referred to the sections of the Act, to show that the prescribed number of days must run from the notice of applotment, which was on the 1st of January. He also referred to analogous Statutes in support of his views.

Mr. COFFEY having replied,

The Magistrates consulted together for a short time, and then said that, they were of opinion that the time for appeal must be reckoned from the 1st of January—that is, from the publication of the notice in the *Dublin Gazette*, and in the newspapers. They were sorry they could not enter into the merits of the case. It was impossible that they should do so, as their opinion upon the construction of the Statute was too clear to admit of their having any doubt at all upon this point. The summons in each case, therefore, must be dismissed.

Miscellaneous News.

GREAT CENTRAL GAS CONSUMERS COMPANY.

The Ordinary Half-Yearly Meeting of the Proprietors was held at the London Tavern, Bishopsgate Street, on Friday evening, April 25—Alderman DAKIN in the chair.

Mr. MASSEY (the secretary) read the notice convening the meeting, and the seal of the company was affixed to the register of shareholders.

The following report and statement of accounts,* having been previously printed and circulated, were taken as read.

The directors beg to lay before the shareholders the balance-sheet, and manufacturing and distribution accounts for the year ending December 31 last, made up in the form required by the Secretary of State for the Home Department, in conformity with the powers given to him by the Metropolis Gas Act, 1860; and, although the Act does not require that the accounts should be audited by professional accountants, as was the case under the company's special Act, the directors were of opinion that it would be more satisfactory to the shareholders, as well as to themselves, that the several books and vouchers of the company should be subject to an examination by professional accountants; they determined, therefore, to continue the former practice, by availing themselves of the services of Mr. Begbie and Mr. Chatteris, who have audited the accounts since the year 1851.

The directors are happy to report that, after paying all working and manufacturing charges, carrying a further sum of £6872. 14s. to the wear and tear account, and £6653. 13s. 6d. towards the Wood Street Fire account, there remains a balance of £6690. 7s. 7d. available for dividend, from which the directors recommend that a dividend, at the rate of 6 per cent. per annum, free of income-tax, be declared, payable on and after the 9th day of May next, leaving a surplus of £1525. 11s. 7d., to be carried to the next half year.

The receipts for gas and products, as compared with those of 1860, show an increase of £1349. 17. 10d.; this excess is entirely attributable to the higher prices obtained for the products during the early part of the year, when the price of coke ruled unusually high. The actual receipts for gas are rather less than in the year 1860, a diminution of rental common to most of the other metropolitan gas companies, and which may be attributable partly to the increased quality of the gas supplied, and partly to the absence of average dark weather during the winter months.

In the report of October last, it was stated that the directors had issued notices to the consumers that, on the 29th of September, the company would come under the provisions of the Metropolis Gas Act, 1860, requiring increased purity and illuminating power in the gas supplied, and for which the company was entitled to charge 4s. 6d. per 1000 cubic feet. As the power to make this extra charge for the improved quality was considered doubtful by the Commissioners of Sewers, your directors agreed with them that a joint case should be submitted to the Court of Common Pleas for its judgment—Whether this company was, or was not, in the matter of price, included in the operations of the Act of 1860?

On the 8th of February, the case was argued before Justices Williams, Willes, Byles, and Keating, when an unanimous decision was given, that this company was included in, and came under the provisions of that Act; since then, it is understood that the Court of Sewers are dissatisfied with that decision, and they have determined to move the case by writ of error to the Exchequer Chamber. The directors are advised that there is little chance of the unanimous judgment of the Court of Common Pleas, immediately given, being disturbed; it may be mentioned, as showing the feeling of the consumers, that the increased price for the improved quality has been cheerfully paid, and that no consumer has discontinued the use of this company's gas in consequence.

By a resolution of the half-yearly meeting in October last, it was determined, for the purposes of paying the cost of the extension of the 36-inch main to the City, and to supply working capital, to issue 1721 shares; of these, 1326 have been taken up by the shareholders, which will supply sufficient capital for the present wants of the company.

The contract for the supply of the 36-inch main has been entered into on favourable terms; the first delivery of pipes is expected daily. A contract has also been accepted by the directors from Messrs. Aird and Son, to lay the same; it is anticipated the whole will be completed in time to meet the demand for the ensuing winter.

The following report from the manager shows that the works and plant are in a thoroughly efficient state of repair, and in complete working order:—

"*To the Chairman and Directors of the Great Central Gas Company.*

"Gentlemen,—In submitting to you my half-yearly report on your works, I am happy to be able to state that they have proved thoroughly efficient for the manufacture of the gas required through the past winter, and that they are now in a very effective and substantial state.

"The only repairs that will be required during the summer are the resetting of four of the beds of retorts; of these four, three are those referred to in my report of October 15, 1861, and which, as I then anticipated, have been in work all through the winter.

"The extension of the 36-inch main in the yard, completed during last summer, increased the pressure in the meter-house, during the heaviest hours of the winter consumption, 2-10ths of an inch.

"It may be judicious to increase the amount of coal-store-room during the ensuing summer, to prevent the coals becoming wet, and deteriorated in quality by exposure to the weather.—I have, &c.,

(Signed) "ROBERT HARRIS.

"*Gas-Works, Bow Common Lane, London, April* 17, 1862."

The following extract from Dr. Letheby's report to the Commissioners of Sewers, shows that the illuminating power of the gas, as well as its purity, has been satisfactory:—

"*To the Honourable the Commissioners of Sewers of the City of London.*

"Gentlemen,—I have the honour to submit my quarterly report of the illuminating power and chemical quality of the gas supplied to the City of London by the Great Central Gas Consumers Company, during the quarter which has just expired.

"In the course of that time, 321 examinations have been made of the illuminating power of the gas; 232 of these were made at the laboratory of the London Hospital, and 89 at your laboratory in Finsbury Square. The results of these are: that, at the former place, the illuminating power of the gas was equal to that of 13·58 sperm candles, or 15·52 wax, of standard consumption; and, at the latter place, it was equal to 13·13 sperm, or 14·01 wax. These numbers give a mean proportion of rather more than 11 per cent. above the requirements of the Metropolis Gas Act, 1860, or about 27 per cent. above that of the Great Central Act of 1851.

* * * * * * * * *

"The chemical quality of the gas has also been good, as regards the absence of sulphuretted hydrogen and excess of ammonia.

(Signed) "HY. LETHEBY.

"41, *Finsbury Square, Feb.* 13, 1862."

Three of your directors—Mr. Bovill, Mr. Massey, and Mr. Virtue—retire by rotation, and, being eligible for re-election, offer themselves accordingly.

The CHAIRMAN: Gentlemen, it becomes my duty now to move the adoption of the report and accounts which have been circulated among the shareholders, and, in doing so, I do not think that it will be my duty or my privilege to occupy much of your time upon the present occasion. I think you will agree with me that the report, taken as a whole, is of a satisfactory character, and that the statements contained in its various paragraphs are such as you ought to be very well pleased with, not only as regards our present position, but, because having gone through a series of misfortunes to which all young companies are liable, they present to us the prospect in the future of starting clear of such calamities, and of achieving that which of course we all desire, and which the Legislature has said we ought to have—viz., a dividend of 10 per cent. upon the capital embarked in this undertaking. You will perceive, for the first time, that the form of the balance-sheet has been

* For accounts, see next page.

ANNUAL STATEMENT OF ACCOUNTS,

Showing the Actual State and Condition of the Concerns of the Great Central Gas Consumers Company, for the Twelve Months, ended the 31st Day of December, 1861, made to Her Majesty's Secretary of State for the Home Department, pursuant to the 41st section of the 23rd & 24th Vict., c. 125.

I. CAPITAL.—*State of the Account at the End of the above Twelve Months.*

Statute, or authority, under which raised.	Number of Shares.	Amount per Share.	Paid up per Share.	Total paid up.	Total capital.
Shares	17,216	£10	All.	£172,160	£172,160 0 0
14th & 15th Vict., c. 69, 1851.					
			Rate per Cent.	Amount.	
Borrowed moneys			5	£66,000	66,000 0 0
Profits capitalized					None.
			Total capital		£238,160 0 0

II. REVENUE.—*Account during the above Twelve Months.*

RECEIPT.			EXPENDITURE.		
Balances brought forward—			Management—		
Reserve-fund	£6,098 0 6		Directors allowances	£1,000 0 0	
Revenue account	1,538 13 4		Salary of secretary and clerks	1,045 14 0	
Dividend ditto	5,164 16 0		Collectors commission and pay	611 3 0	
	£12,801 9 10		Rent, rates, and taxes of offices	291 8 3	
Sale of gas—			General charges, including stationery and printing	1,267 15 9	
Common gas, at 4s. per 1000 feet	54,075 7 6		Payment to auditors	83 13 3	
Public lighting and under contracts	7,807 10 10			£4,299 14 3	
	61,882 18 4		Manufacture of gas—		
Ditto of old materials	174 2 2		Coals, including carriage dues, &c.	£30,759 13 7	
Ditto of residual products—			Purifying materials	726 3 0	
Coke and breeze	£17,417 1 6		Supervision and labour	10,382 12 5	
Tar and ammoniacal liquid	3,207 17 10		Stores, tools, and implements	1,336 13 0	
	20,624 19 4		Ordinary repair, and maintenance of premises	2,266 6 11	
Miscellaneous receipts	39 7 6		Rents, rates, and taxes of manufactory	955 1 6	
				46,426 10 5	
			Distribution, including service-mains, pipes, &c.:—		
			Ordinary repair and maintenance	£5,149 18 8	
			Meters—		
			Restoring and replacing	518 14 2	
				5,668 12 10	
			Law and parliamentary charges	£4,569 14 1	
			Interests paid from profits, on £66,000 borrowed capital, at 5 per cent.	3,298 17 5	
			Wood Street Fire—first instalment	2,500 0 0	
			Arbitrators award	1,035 1 0	
			Reserve-fund for contingency, wear and tear, or other purposes	10,704 7 7	
				22,106 0 1	
			Balance for shareholders profit	15,494 8 0	
Total receipt	£95,522 17 1		Total expenditure	£93,997 5 7	
Ditto expenditure	93,997 5 7				
Balance to revenue next year	£1,525 11 7				

III. DIVIDENDS.—*Account of all Dividends actually Paid in the above Twelve Months.*

Balance for shareholders profit as above	£15,494 8 0	Dividends on £172,160 capital stock, 6 per cent.	£10,329 12 0
		Balance to next year's account	5,164 16 0
	£15,494 8 0		£15,494 8 0

We have examined the above accounts, and certify them to be correct.

THOMAS DAKIN, *Chairman.*
R. M. MASSEY, *Secretary.*

altered. You are aware that Parliament has made a law regulating the gas supply of the metropolis, with a view of doing for gas companies what it had previously done in the case of water companies—that of making the supply and price to the consumers of these articles uniform, and of making the maximum dividends to the shareholders uniform also. Whatever may be said with regard to those outside who may be affected by the question of price and quality, I am sure the more we consider the recent legislation which has taken place in reference to the supply of gas, the more it must commend itself to our judgment as the best for all parties concerned. In the first place, it takes under effective control the whole of the companies supplying gas to the metropolis. It is very true that the citizens of London, eleven years ago, did that for themselves in connexion with the establishment of this company, which had not been done in other parts of the metropolis, and the Act of Parliament under which we are incorporated is in effect very nearly the model Act which Parliament has since adopted, except as to the increase of quality. And, when you consider the importance which the supply of gas now assumes, I think you will feel that it is a subject in every way worthy of that lengthened and serious consideration which was given to it by the very able parliamentary committee which sat upon it with Mr. Sotheron Estcourt at its head. The Act of 1860 prescribes uniformity of quality and, what is of very great importance—an importance which, I think, has not been sufficiently estimated—it takes under its cognizance that very serious matter, the question of the purity of gas. Gas has now become an article of such extensive use and application, not only for the illumination of our rooms, and the lighting of our streets, but likewise for the lighting of manufacturing premises, where large masses of men are congregated together, that it is of the utmost consequence the quality of the gas so supplied should be of the greatest purity, so as not to deteriorate the air which workmen are compelled to breathe for many hours together. A very intelligent manufacturer in the metropolis, who is one of our largest consumers, and employs a large number of men, was speaking to me on the subject the other day. "Talk," he said, "of the extra 6d. per 1000 feet; I would give that 6d. cheerfully, or any larger sum, if I could make sure that the workmen who are engaged in my factory for my purposes could always have that which is necessary to throw light upon their operations of such purity that their health, spirits, and energies, would be unaffected by it." When we think of these matters, we see at once that it is a matter of the deepest importance. To those who have large bodies of men engaged in the various warehouses and manufactories in the City, it is a question not only of humanity, but of the productiveness of their labour which is involved, because if anything interferes with their power of working, there is not only damage sustained to themselves, but a direct injury is inflicted upon their employers. And then, gentlemen, not only has the Legislature decided this point, but it has taken most effective steps that all the metropolitan gas companies by having uniformity of accounts, and by being required to submit those accounts annually, through the Secretary of State, to Parliament, shall afford the fullest opportunity for ascertaining the working of their establishment. By the balance-sheet now before you, the proper authority at the Home Office can see at once the effective working of this company, and can ascertain, item by item, the whole of our receipts and expenditure, so that if there were any disposition to evade the result of an investigation into the affairs of the company, the attempt to do so would be entirely frustrated by the very nature of the return which we are required to make. You will perceive that the accounts now placed before you do not bear the names of the auditors, Messrs. Begbie and Chatteris. As stated in the report, the directors, for their own sake, as well as for yours, before sending these accounts to the Home Office, under the signature of the chairman and secretary, thought it most desirable that those accounts should undergo the searching investigation which those eminent accountants always give to our affairs; and, though this investigation may involve an expenditure of some £70 or £80, we are sure you will not think that that money is ill-spent in obtaining so thorough and satisfactory a supervision. Gentlemen, I think you will see by the various paragraphs in the report that there is nothing in it but what is a fair subject for congratulation. The important paragraph which is the index of the whole result of manufacture, is the second one, which says—"The directors are happy to report that, after paying all working and manufacturing charges, carrying a further sum of £6872. 14s. to the wear and tear account, and £6653. 13s. 6d. towards the Wood Street fire account, there remains a balance of £6690. 7. 7d. available for dividend, from which the directors recommend that a dividend at the rate of 6 per cent. per annum, free of income-tax, be declared payable on and after the 9th day of May next, leaving a surplus of £1525. 11s. 7d. to be carried to the next half year." Now, I think that that is a very satisfactory paragraph. The dividend, it is true, is not what you have a right to expect, nor what we hope hereafter to be able to give you, but you will perceive (and, I think, you will justify our proceeding in that respect) that we have placed a considerable sum to wear and tear account, which account, as you will see by referring to the balance-sheet, now stands at £10,704. We feel that it is most desirable to have, as soon as possible, that which Parliament allows us to have, viz., a proper reserve out of profits to meet repairs and any of those casualties, to which, unfortunately, gas companies are liable. You will, doubtless, have seen in the public prints, that within the last few days, an accident of, if possible, a more serious character than that which happened in Wood Street, has occurred in the district of the London Gas Company, in Holborn, because there it has resulted in loss of life, whereas, in our case, it involved the loss of a large sum of money. In both cases, there is a great obscurity as to the cause of the accident, and, therefore, while we are endeavouring to use every caution

which the occurrence of these misfortunes suggests the importance of, and trust that many long years will pass over, before such lamentable results will be seen again, we think it right, and Parliament has endorsed the opinion that we should lay by a fair sum, as a reserve, to meet such contingencies, should they ever recur. The sum paid, according to these accounts, for the Wood Street fire, expunges, I am glad to say, all the claims for law charges, in connexion with that unfortunate case, the law charges to the parties who claimed, and also our own in fighting the battle in the best way we could. This sum of £6653, pays the whole of those charges as well the first instalment of £2500, so that the future revenue of the company will not be encumbered with anything more on law account in future.

Mr. NICHOLSON: While on that point, it would be as well we should clearly understand the question. Did I rightly hear you say that the sum you now take discharges all the law costs?

The CHAIRMAN: It does.

Mr. NICHOLSON: But does it also expunge the amount awarded to the parties for the damage done?

The CHAIRMAN: No.

Mr. NICHOLSON: Then I would go on to ask how much the future revenue of the company will have to meet in respect to that fire?

The CHAIRMAN: I will give the proprietors the precise figures. The company are liable, under an award of the Court of Queen's Bench, dated the 4th of July, 1861, to pay the sum of £25,000, as follows, viz.—£2500 on the the 4th of January, 1862 (my remark went to this, that we have paid that amount out of the revenue of the last half year, and likewise we have paid all the law charges which have been incurred in defending the action, and all the law charges payable to the parties who brought the action); we also have to pay £3500 in twelve months from the date of the order; and the residue of the £25,000 by four equal instalments on the 1st day of July 1863, 1864, 1865, and 1866. Of course, the shareholders will see that, in the past year, we have only had one quarter's gas consumption at the price of 4s. 6d., the other three quarters being at 4s. per 1000. For the current year, we have the whole four quarters at 4s. 6d. I merely remind the proprietors of that fact, not wishing unduly to exalt the position of the company, but to prove that I was justified in referring to the paragraph in the report, in stating that a very wholesome state of things exists, and one which leads us to hope we shall be able, during the ensuing year, to give you a better dividend than we are now able to declare. It will be observed, by the third paragraph in the report, that we have been very much indebted for the good results of the working of the half year to the increased price of products. My friend, Dr. Letheby, very humorously remarked, on one occasion, that by-and-bye, if products went on increasing in value, it was possible they would come to be the important part of our manufacture, and that gas itself would be the residuum. Without going to that extent, no doubt there is a very marked and material increase in the price obtained for the products evolved in the manufacture of gas. It is only this very day, in the adjoining room, we have got a slight increase in our contract for ammoniacal liquor; and our coke, which is so important an item in our products, rules very high. I do not think that, during the entire year, we shall obtain the high price which we obtained in the year that is past; still, it keeps up very satisfactorily. Then, gentlemen will see, there is no doubt about the fact—and we must not hide it from our calculations—that, in giving gas of a higher illuminating power to the public, we shall, to a certain extent, diminish our rental. There is no fact better known than this, that if you give increased illuminating power, you have a decreased quantity to produce the given amount of light. To some extent, this has already had an effect, and will account for the fact that the usual increase in our gas-rental has not obtained in the last half year; indeed, there has been a decrease, although but slight. I am aware that there have been other disturbing causes, by which all the gas companies in the metropolis have been affected. We have had unusually light weather, and somewhat less hours of labour, so that so much gas has not been consumed. I wish now to make a few remarks to the proprietors with regard to the state of a question which is one of great importance, and has been one of great anxiety to the directors—I mean the question raised by the authorities of the City of London, and which amounts to this, that the Great Central Gas Company alone of all the companies in the metropolis, are not entitled to charge 4s. 6d. per 1000 for their gas. The argument has been used, and strongly pressed that, though we came under all the other provisions of the Metropolis Gas Act—while we were bound to give 14 per cent. increased illuminating power, and in all respects were fettered by the stringent requirements of that Act, we were not at liberty to avail ourselves of that which the Legislature had said in our case, as in that of every gas company in the metropolis, was the fair, just, and equitable reward for the increased services demanded of us. Well, gentlemen, I am sure you went with us in your approval, when we most vigorously opposed that view of the case. I and some of my friends came in for a large share of abuse and obloquy in defending our position. I did not, however, regard that, for I felt that in my position, charged as I was with the protection of a quarter of a million of the capital of the shareholders in this company, I had but one duty to perform, and that duty went in the direction of maintaining what common sense and equity told me was right. It was exceedingly gratifying to us all to find that, when on the 8th of February last, the case was argued before the four judges of the Court of Common Pleas, there was not the slightest doubt or hesitation in their lordships minds on this point. The whole argument seemed to go one way, and so clearly was the case in our favour, that the judges said they would not even delay their judgment, as there was no point made on the other side to make the matter in any respect doubtful or hazy. They, therefore, then and there gave the unanimous judgment of the court, affirming the view which we had always felt was the correct one. I must confess to having experienced considerable surprise that, after such a decision, it was resolved by a majority of the body which has the charge of these matters in the City, to appeal from the judgment of the Court of Common Pleas to the Exchequer Chamber. What their object can be I can scarcely conceive, for I think, on all hands it is admitted that there is a very slender chance of that judgment being repealed or altered. At any rate, we shall take care to employ the most eminent counsel—Sir Fitzroy Kelly, Mr. Lush, and other gentlemen, to defend our position, and shall zealously maintain what we believe to be the justice of the case and the rights of our brother shareholders. Now, gentlemen, I have, I think, only one other matter of importance to mention. During the last year, the only addition to the capital account of the company is £1048. 4s. That addition has arisen from the necessity of remodelling the yard-connexions on the works, and having large mains laid down there in place of some small pieces, for the passage of the gas from the retorts to the gasholders, and out of the works. Our excellent superintendent suggested that, by laying this larger main, we should get what we wanted—an increase of pressure; and, in the result, by the remodelling I have referred to, we have gained 2-10ths of pressure, at the expense I have named—£1048. 4s.—which, I think, you will consider is no large addition to the capital of the company, and has been well employed. The other matter which I would mention is this. At our last meeting, we were authorized to take steps to continue our 36-inch main into the City, from the road where it terminates. We have been very fortunate in the time of year when we determined to do it; for I believe the price of iron has never ruled so low as it has done in this case. I think our contract for the main was taken at £4. 5s. per ton, which is a most unusually small price; and, considering that we require more than a thousand tons to be employed in the matter, it is so far fortunate. We shall, within three weeks, have arrivals of these mains. We have a person down at the works where they are cast, to take care that they are properly proved, and that everything is done in the best way; and the eminent main-layers, Messrs. Aird and Son, have contracted for laying them down—so that, by the middle of the year, I have no doubt we shall have that important work completed, which will enable us to give a very satisfactory supply of gas to our consumers, and will diminish materially, I hope, the per centage of waste. You will perceive, from the report of the manager, that the works are in a thoroughly efficient state of repair; and you will likewise perceive, from the testimonial of Dr. Letheby, that, while working satisfactorily as far as figures are concerned, we are likewise working satisfactorily as far as the quality of the gas and its purity are concerned. Therefore, I repeat what I said before: I think the account we have to present to you to-day affords matter for congratulation in the past, and affords good hope of prosperous results in the future. With these remarks, I beg to move—"That the report and accounts, as circulated among the proprietors, be received and adopted; and that a dividend be now declared, for the half year ending the 31st of December last, at the rate of 6 per cent. per annum, free of income-tax, payable on and after the 9th day of May next."

Alderman GABRIEL (deputy-chairman): I think, as the chairman has so fully gone through the report, there is nothing left for me to do but to second the resolution which he has proposed.

The motion was put, and carried unanimously.

The CHAIRMAN: I have now the pleasure to move, that my excellent colleague, Mr. Bovill, whose scientific knowledge as an engineer is of great advantage to us, be re-elected a director of this company.

Mr. NICHOLSON: I have much pleasure in seconding that resolution, knowing well the services which Mr. Bovill has rendered in the management of our affairs.

The motion was at once agreed to; and the other retiring directors, Messrs. Massey and Virtue, were also cordially re-elected.

Mr. NICHOLSON: I claim the attention of the meeting, while I propose a resolution, which I am sure will be most heartily received and adopted, unless, indeed, it be that some of the shareholders, like myself, think it is inadequate, as an expression of our obligations to the board. It is—"That £1000 be paid to the board of directors for their services to the company during the past year." Now, I do not propose on this occasion to attempt to alter the form of the resolution which has been intrusted to me, because as this is the sum you have been accustomed to award to the directors, I presume you will be content to continue that rate of remuneration, so long as the shareholders only receive the unjust dividend of 6 per cent. per annum. As soon as we have arrived at what Parliament has declared to be a fair dividend for money invested in gas-works, viz., 10 per cent., then, I for one, shall be ready to come forward, and propose that a larger sum shall be voted in the shape of remuneration to the directors for their services. That time, I believe, to be not very far distant. I can see my way clearly to an increase of the profits of the company, and, therefore, to a speedy increase in your dividends. But just now such a thing cannot be contemplated, because I entirely agree with the directors that it is desirable they should keep in hand a large reserve of money. That reserve may be required for other purposes than those which the chairman has indicated, viz., to meet those extraordinary attacks which are constantly being made on the company, and, indeed, upon all the gas companies in the City, by the constituted authorities. A great deal might be said upon that subject, but I will abstain from doing so upon this occasion, because in the course of a very few weeks, in all probability, the question which has been agitated in reference to the price of gas, will be finally decided. The Commissioners of Sewers have thought fit to remove a judgment of the Court of Common Pleas, by a writ of error to the Exchequer chamber, and I think, that all they will get for their pains will be the obligation to pay all the expenses of the inquiry, which they have originated. If the money had to come out of their own pockets, most assuredly they would deserve the punishment, but, inasmuch, as their constituents will have to pay it, I can only say I pity the poor ratepayers. Gentlemen, I need not tell you how well our directors deserve the reward which I now propose, for their services, but I would just take this occasion to say that the attention which these gentlemen have given to our affairs, while the contention with the Commissioners of Sewers and other bodies have been going on, entitle them not only to all the remuneration in money which we can afford to vote them, but, also, our warmest gratitude and thanks. I know that they all, and especially the chairman have had to stand in the front of the battle, and they have fought well for us, and for our cause. They have done so most manfully and well. With regard to Dr. Letheby's reports, which you may have seen from time to time, I consider great praise is due to the directors that they have been able to maintain, to the satisfaction of Dr. Letheby, and, through him, of the public of the City of London, a uniformity in the illuminating power of the gas, ranging something like 1 per cent. above the minimum standard prescribed by Parliament—viz., 12 sperm candles. They have done this with a regularity which I have not observed in any other gas company in the metropolis. I speak as a director of another gas company, and as one who has paid great attention to the subject, and know how difficult it is to maintain that uniformity of illuminating power. Dr. Letheby has not only testified to the credit of the directors and manager that the illuminating power of the gas has been something more than 1 per cent. above the standard requirement in the Act of Parliament, but that the gas has never contained any sulphuretted hydrogen or ammonia; and, therefore, the average quality of our gas has been better than that supplied by any other company in the metropolis. A circumstance has been noticed incidentally by the chairman—viz., that the directors have made a contract for the large mains necessary for the increasing business of the company, at £4. 5s. per ton. That is such a thing as I have never heard of before, and I have had experience for thirty years in making contracts for iron of different sorts and descriptions. Therefore, I say, a very large sum has been saved by the discretion and foresight of the directors in having chosen at the right time to do the right thing, and it is only one among many instances of the care and prudence with which they manage our affairs. I think, having reference to all the circumstances, you will not hesitate to accept the resolution which I have submitted.

Mr. FRANKLIN: I quite concur in the remarks which have been made, and very cheerfully second the motion. My only regret is that the time has not arrived when we could have suggested a larger sum for the remuneration of the directors.

The motion was unanimously adopted.

Dr. BADGER: We have had the pleasure of voting £1000 to the directors;

but I do not suppose that any one here looks upon that as an adequate remuneration for the trouble and anxiety they have undergone in the conduct of our affairs. I look upon it not in the light of a remuneration, but as a sort of *honorarium* and a pledge of our intention to remunerate them properly at a future time. Besides voting them £1000, I think they are entitled to our best thanks for the way in which they have conducted our business. They have navigated our ship through a troublesome sea into what I hope is a safe harbour, and, for their skill and energy, they deserve our thanks. I have, therefore, much pleasure in moving—"That the thanks of the meeting be given to the chairman and board of directors for their services during the past half year."

Mr. NEWTON seconded the resolution, which was cordially adopted.

The CHAIRMAN: Gentlemen, on behalf of my colleagues and myself, I beg to assure you that we are much indebted to the meeting for this unanimous expression of your confidence and approval. My friend, who proposed the resolution, was very eloquent and very figurative. I trust that the figure he employed, in speaking of the company, will prove to be in every respect a correct one, and that in addition to having a good ship we shall have a tranquil sky and favouring winds, and that we shall be able to bring you a good cargo. With regard to other remarks which have been made, I will only say that though your thanks are more valuable to us than the payment we get, yet, whenever we are in a position, as we are now manufacturers, which we were not when we entered your service, to pay you a 10 per cent. dividend, we shall not be unmindful of your promise to remember our labours on your behalf in that less agreeable but still substantial form which has been referred to. I beg leave to thank you for this vote.

A PROPRIETOR: I should like to ask, before we separate, whether, under the recent Act of Parliament, if the profits of the company will allow it, we cannot recoup ourselves for deficient dividends from the commencement of our operations?

The CHAIRMAN: The Act of Parliament stipulates that, when the company are in a position to divide 10 per cent. upon the current half year, they may go back for six years and recoup deficiencies up to that amount before reducing the price of gas.

The proceedings then terminated.

CHARTERED GASLIGHT AND COKE COMPANY.

The Half-Yearly General Court of Proprietors of the Company was held on Friday, the 2nd inst., at the Works, Horseferry Road, Westminster—S. A. BECK, Esq., the Governor, in the chair.

Mr. JOHN ORWELL PHILLIPS, the newly-appointed secretary, read the advertisement convening the meeting, and the minutes of the last general court, which were approved as correctly entered.

The following report and statements of account,* having been previously printed and circulated, were taken as read:—

The directors, in laying before the shareholders their report and the audited accounts for the half year ending Christmas, 1861, avail themselves of the opportunity of expressing their sincere regret at the decease of Mr. Burls, the company's late secretary, their full appreciation of his long and faithful service, and their respect for his memory.

From the accounts now submitted, it will be seen that the hopes expressed in the last report have not been disappointed, and that a great and marked improvement has taken place in the profit of the company.

It will be observed that, while there has been a decrease in working expenses, there has been an increase in the rental for light; and it is gratifying to the directors to be able to state that, notwithstanding this increase, there has been a diminished consumption of coal, as compared with the corresponding period of last year—thus clearly demonstrating that the outlay incurred by the directors, in their endeavours to increase the manufacturing capabilities of the company's works, has been fully justified.

A new coal-store, now nearly completed, at the Goswell Street station, will afford increased stowage to the extent of 2000 additional tons of coal.

The net profits for the half year enable the directors to recommend a dividend at the rate of 8¼ per centum per annum (free of income-tax), the warrants for which will be transmitted by post in the usual way.

The directors, in concluding their report, cannot refrain from coupling with their congratulations on the result of the past half year, anticipations not less cheering with regard to the prospects for the future.

The GOVERNOR: Gentlemen, I will now simply move—"That the report be adopted," in order to give any gentleman present an opportunity of making such remarks as he may desire. I shall have much pleasure in answering any inquiries which may be made, and I will afterwards give you, as usual, the statistics of the company.

Mr. RHODES: I second the motion.

Mr. BENNETT: In the third paragraph of the report, the directors state that, while there has been a decrease in the working expenses, there has been an increase in the rental for light, and also that there has been a diminished consumption of coal as compared with the corresponding period of last year. Now, here is a combination of circumstances all tending to one result as I should have supposed—viz., an increase of dividend. But the fact is that, whereas in the corresponding period of last year you declared a dividend of 9 per cent., to-day you are only offering us 8¼. I have no doubt this is capable of explanation, but it certainly, on the face of it, seems strange if the statements made in this paragraph of the report are correct.

The GOVERNOR: It will be explained in this way. If you look at the accounts for the half year ending Christmas, 1860, you will find an item of £3246 in the profit and loss account as premium received on 150 re-issued shares. That premium alone was rather more than 1 per cent. upon our capital, which will give you the reason why we paid 9 per cent. On this occasion, we are proposing a dividend of 8¼ per cent. out of the actual profits of the concern, and upon a larger capital.

Mr. BENNETT: Then, I will ask another question. For what purpose was the contingent-fund created and maintained?

The GOVERNOR: I can hardly tell you the precise circumstances under which it was created. It was commenced some thirty or forty years ago to meet contingencies that might arise; but, I believe, the only contingency which was then anticipated was the blowing up of a gasholder. At one time, it amounted to £40,000; we then took £30,000 of it for the purpose of defraying the cost of laying duplicate mains for the supply of cannel gas; and, subsequently, it was decided to increase the fund to £25,000.

Mr. BENNETT: I understood last half year, when the dividend was only 6½ per cent., that it was owing to a combination of circumstances which led to the company having to pay a large additional sum for coals. Were not those circumstances such as might justify our having recourse to the contingent-fund? I have always thought that the object of such a fund was to equalize dividends.

The GOVERNOR: We certainly never considered it so, and I think it would be a very unfortunate thing for the company to resort to that fund, to make up dividends which fell short.

Mr. PERRY: I made the motion in the first instance, for the establishment of the contingent-fund, the object of which was to provide against any unforeseen circumstances by which the dividends would be affected. It appears, however, that it has never been used in that way. I certainly consider that it was intended to meet such a case as that of an extraordinary rise in the price of coals, by which the dividends might fall short.

The GOVERNOR: I have been a director of this company for twelve years, and I never heard such a proposition mooted. The difficulty in the case would be, supposing it were intended to make such an appropriation of the fund, as to what you would fix the maximum and minimum of your dividend. For many years we only paid 6 per cent., though I have no hesitation in saying we could have paid 10. But, now we give the proprietors the utmost dividend which the profits of the half year will enable us to pay, and I certainly do not consider we are bound to make up in any half year the falling-off of 1 or 2 per cent. from the previous one. Indeed, under the Metropolis Gas Act, I think we could not do so.

Mr. BENNETT: Then, what is the use of keeping up the fund?

The GOVERNOR: To meet extraordinary contingencies, such as we had at one of our stations a year or two ago, when a gasholder was destroyed.

Mr. BARKER: I have been a director of the company nearly forty years, and I have never heard of the contingent-fund being applicable to make up dividends. It was intended solely for the purpose of meeting extraordinary circumstances happening at the works, and to prevent the necessity, in such events, of appropriating the profits of any one half year.

The GOVERNOR: I have now the original minute before me, which refers to the creation of the contingent-fund. It is dated May, 1826, and cites an arrangement with the Phœnix Company, and states that the directors had appropriated a portion of the consideration money to the creation of a contingent-fund, the amount of which was to be "applicable to any purpose beneficial to the company, and which the exigencies of the company require."

Mr. GRAY: I think it must be evident that the honourable proprietor (Mr. Bennett) is wrong in his interpretation of the intention of such a fund when he supposes that it was to make provision to meet an unexpected rise in the price of coals. Clearly such a fund is created for the purpose of meeting any loss arising from accidental circumstances. I need hardly remind him that the Great Central Gas Company have recently had to meet a loss of £25,000, in consequence of an explosion in laying on a service from their main. Such an untoward circumstance might happen to us, and this fund would enable the directors to meet the loss without having recourse to the proprietors. To apply the fund in any other way would be injurious to the interests of the company. I think there should be a limit to the amount of the fund, and I consider our directors have acted wisely in fixing that limit at £25,000.

Mr. RUSSELL: I understood, on the last occasion, that the company were their own insurers; and, that being the case, I think the loss we sustained with our coal vessels last year should be charged to the contingent-fund.

The GOVERNOR: We have been our own insurers for many years, and have made a large profit by it, inasmuch as for thirty years we did not lose a single ship; we, therefore, thought it was not right that when, through the heavy gales last year, we lost three vessels, the contingent-fund should be charged with that loss.

Mr. GOLES: I see in the profit and loss account, there is an item of "Retorts and setting, including labour, £3588. 18s. 7d." Then, turning to the balance-sheet, under the head of Westminster station, I find charges for new retorts, roof to coal-store, &c.; and, at the Brick Lane station, there are similar items. May I ask why these last-named items are not charged to profit and loss in the same way as the first.

The GOVERNOR: The answer is, that when we enlarge any portion of our works, as we have done in the case of the retort-house, we charge the value of the increased capacity to capital, and the remainder to profit and loss. If, instead of increasing the capacity of the retort-house from eight to eleven beds, we had built a new one, the whole would have been charged to capital. The coal-store is a new one; and, the roof having been put on during the last half year, the cost of it is charged in the present balance-sheet.

Mr. GOLES: The amount due for rent of light at the Westminster station appears to be very large?

The GOVERNOR: You must recollect that that is the amount that was due on the day up to which these accounts were made up, and that at that time we had not collected anything. Our collection is remarkably good; I believe it is 93 per cent.

Mr. BROWN: In the report, I find the directors congratulate us upon our increased rental, and I really must ask you to enlighten us upon the subject, for I do not perceive it from the accounts.

The GOVERNOR: It is very small—it is only about £400—but you must couple that with the fact that there has been a much smaller consumption of coal—nearly 4000 tons less. In answer to further questions by the same honourable proprietor, the governor said: We have a Works Committee, whose duty it is to take cognizance of the quality of the coals used; and the directors, in making their contracts, are guided by the experience obtained in that way. There are four or five collieries which are considered first-rate for gas-coals, and from them we obtain terms before entering into contracts. If a new coal is offered, and it is thought desirable, we buy two or three cargoes; and, if the result of the experiment is beneficial, we go into it. As a rule, we buy our coal at the pit's mouth; but we leave ourselves a margin, so that if, in the course of the year, the price of coal in the Pool is low, we have the opportunity of purchasing there. Our experience is, that the quality even of the same description of coal varies at times. The average produce of our coals during the last half year was 9426 cubic feet of gas, which is an increase of 6½ per cent. upon the corresponding period of 1860. But it is rather a fallacious test to take the quantity of gas produced from a ton of coals as the sole criterion of value; because, if we get 10,000 or 10,500 cubic feet from a ton, the gas will be so much weaker. We are bound by the Act of Parliament to supply gas of the illuminating power of 12 sperm candles; and, in order to do that, we must make it at least equal to 13; and, to get that illuminating power, we cannot go beyond a certain quantity.

Mr. GRAY: I am quite certain, from my experience, that if your gas has averaged 9426 cubic feet per ton, the coal used must have been of unexceptionable quality.

Mr. BOX, after making a variety of inquiries, which were subsequently replied to by the chairman, congratulated the company on the present position of its affairs.

Mr. BESLEY: Can you inform us whether any arrangement has been entered into with the Commissioners of Sewers with reference to the supply of gas in the City? I have not seen any of those bitter attacks upon the gas companies lately, and should like to know whether the threatened opposition to the rise in price has been disposed of?

The GOVERNOR: The corporation have withdrawn their bill.

Mr. BESLEY: I dare say some of the proprietors have noticed the ugly cans attached to some of the street-lamps in the City. May I ask what they are supposed to be?

* For accounts, see next page.

Dr. *Profit and Loss Account, from June 24, 1861, to December 25, 1861.* *Cr.*

To Coals consumed in the half year, including labour							£57,093	9	9
Stores, &c., used, viz.:—									
Retorts and setting, including labour							3,588	18	7
Lamps and lamp lighting, ditto							2,289	9	6
General wear and tear, and mains					£9,316	19	1		
Less received for old and burnt stores					316	10	0		
							9,000	9	1
Carrying on the works							2,679	1	6
Meters and fixing, including labour							3,155	3	10
Paving							707	2	9
Directors and auditors							1,242	3	0
Salaries and commissions							4,590	2	4
Wages and contingencies, viz.:—									
Wages					£12,138	10	2		
Contingencies					942	0	11		
							13,080	11	1
Rent and taxes, viz.:—									
Rent					£ 397	13	11		
Taxes					2,702	18	0		
							3,100	11	11
Income-tax							1,164	19	9
Law expenses							346	9	8
Annuity to Mr. J. Cowell, late accountant							65	0	0
Sick and benevolent fund							130	0	0
Debts due at the stations, being bad, written off					£ 909	3	6		
Received on bad debts					31	16	1		
							877	7	5
Depreciation of gasholder on leasehold property							50	0	0
							£103,161	0	2
Balance							29,316	16	8
							£132,477	16	10

By Rental of light for the half year								£107,801	2	10
Coke and breeze, deducting labour, viz.:—										
Coke							£16,184	9	9	
Breeze							801	17	10	
								16,986	7	7
Tar and other products, deducting labour								5,199	9	10
Discounts and abatements allowed by tradesmen for cash payments								1,443	14	3
Poplar station rent account, balance								11	15	8
Rents received								482	15	6
Interest received on deposits at bankers								258	10	1
Costs of appeal recovered from the parish of St. Botolph, Bishopsgate								125	0	0
Rates recovered from ditto								169	1	1
								£132,477	16	10

Dr. *Balance-Sheet, December 25, 1861.* *Cr.*

To 1st, 2nd, and 3rd capitals							£600,000	0	0
Fourth capital at Midsummer				£60,000	0	0			
Amount received this half year on account of further call upon 4th capital				59,460	0	0			
							119,460	0	0
							£719,460	0	0
Expended, viz.:—									
Westminster station—									
Balance at Midsummer			£389,103	3	2				
Expended this half year, viz.:—									
For Purchase of freehold and leasehold property	£ 396	5	0						
New retorts	866	4	4						
Ditto roof to coal-store	67	16	7						
Ditto scrubber	250	0	0						
				1,580	5	11			
							£390,683	9	1
Brick Lane station—									
Balance at Midsummer			£164,398	19	4				
Expended this half year, viz.:—									
For new purifiers	£ 356	15	6						
Do. photometer-room	86	14	1						
Ditto exhauster	221	16	7						
Ditto sulphate apparatus	449	9	4						
Ditto roof to coal-store	209	18	6						
Ditto retorts	1,032	7	1						
Ditto mains	74	4	2						
				2,431	5	3			
							166,630	4	7
Curtain Road station—									
Balance at Midsummer			£79,147	5	8				
Expended this half year, viz.:—									
For Purchase of freehold and leasehold property	£1,139	0	8						
New gasholder	3,656	10	2						
Ditto well	262	7	0						
Ditto steam-engine	248	0	0						
Ditto engine-house	111	13	10						
Ditto mains	87	10	9						
				5,505	2	5			
							84,652	8	1
							642,166	1	9
							£77,293	18	3
Dividends remaining unpaid							5,475	17	0
Debts due by the company for coals, and to sundry tradesmen and others							9,197	7	4
Amount due to collectors for commission, viz.:—									
Westminster station					£ 324	14	0		
Brick Lane ditto					132	7	0		
Curtain Road ditto					57	19	9		
							515	0	9
Amount due for wages and contingencies, viz.:—									
Westminster station					£ 590	11	9		
Brick Lane ditto					304	12	3		
Curtain Road ditto					103	13	5		
							998	17	5
Amount due at chief office for contingencies							7	18	9
Balance of profit and loss, viz.:—									
Balance to June 24, 1861			£21,663	16	7				
Less half year's dividend on £660,000			21,450	0	0				
				£ 213	16	7			
Profit of the half year ending Dec. 25, 1861				29,316	16	8			
							29,530	13	3
Contingent-fund, at Midsummer, 1861				£17,848	8	3			
Add dividend received on amount invested				273	4	11			
							18,121	13	2
Depreciation of gasholder on leasehold property, at Midsummer, 1861				£ 203	4	0			
Add proportion for this half year				50	0	0			
Ditto dividend received on amount invested				2	9	8			
							255	13	8
							£141,396	19	7

By Amount due to the company, viz.:—									
For rent of light at the several stations, viz.:—									
Westminster station							£46,610	16	4
Brick Lane ditto							22,525	12	11
Curtain Road ditto							11,280	19	6
								£80,417	8	9
For coke and breeze sold at the stations, viz.:—									
Westminster station							£1,162	11	7
Brick Lane ditto							1,454	15	7
Curtain Road ditto							215	18	6
								2,833	5	8
For tar and other products sold at the stations								455	9	10
Balances of sundry accounts due to the company								1,093	2	0
Treasurer's accounts, viz.:—									
Balance of general account							£8,717	11	11	
Ditto of dividend ditto							536	13	0	
								9,254	4	11
Cash advanced to pay wages at the stations								1,080	0	0
Bills on hand not paid								7	5	0
Stores on hand, viz.:—									
Westminster station							£3,653	7	7	
Brick Lane ditto							2,348	6	8	
								6,001	14	3
Coals on hand, viz.:—									
Westminster station							£12,264	5	6	
Brick Lane ditto							5,425	16	11	
Curtain Road ditto							661	10	5	
On shipboard							1,916	1	8	
								20,267	14	6
Coke and breeze on hand, viz.:—									
Westminster station							£ 157	7	7	
Brick Lane ditto							95	10	7	
Curtain Road ditto							35	0	0	
								287	18	2
Tar and other products on hand								722	9	11
Ship *Dispatch*								648	19	9
Depreciation-fund, for gasholder on leasehold property, invested in the purchase of £223. 8s. 7d. Reduced Three per Cent. Annuities								205	13	8
Contingent-fund, invested in the purchase of £19,221. 13s. 2d. Reduced Three per Cent. Annuities								18,121	13	2
								£141,396	19	7

The GOVERNOR: I am happy to say they are not upon our lamps; but, upon those of the Great Central Company. Those boxes are filled with naphtha, through which the gas passes, and it is supposed to strengthen the gas, so that a less number of feet are required to give the same light. They pay nearly £1 a lamp, I believe, to the patentee.

Mr. BESLEY: May I ask whether it is intended to make an early call upon the new shares?

The GOVERNOR: I am afraid I cannot answer that question. I will now give you the short statement of the results of the half year, as usual, which I think, on the whole, you will find satisfactory. For the half year ending Christmas last, the number of tons of coal used was 59,889, and the cost was £57,093. In the half year ending Christmas, 1860, the number of tons was 63,533, and the cost £57,055. The cost per ton of coals in the last half year was 19s. 0¾d.; in 1860, it was 17s. 11½d. The increase in 1861, was due to the enhanced price of coals, and the higher rate of freight. Had we been able to buy our coals last year with the same advantage we did the year before, there would have been a saving of some £2000 or £3000, which would have given us so much more for dividend. Still, as you will perceive by the accounts, we have an increased rental from 4000 tons of coal less during the last half year. The gas made in the half year ending Christmas, 1860, was 563,778,000 cubic feet, and in the last half year it was 564,493,000 cubic feet, being an increase in the gas made of ¼ per cent. The gas per ton of coals, at Christmas, 1860, was 8874 cubic feet, and at Christmas, 1861, it was 9426 cubic feet, being an increase of 6¼ per cent. The rental of light, at Christmas, 1860, was £107,362, and at Christmas, 1861, it was £107,801, being an increase of nearly ½ per cent. This increase, it is true, is very small; but then, you will remember, it is from 4000 tons of coal less. The products at Christmas, 1860, were £22,536, and, in 1861, they were £22,185—decrease, 1½ per cent. If you will look at the accounts, you will see that the coke alone has produced nearly £3000 less, and this is a circumstance over which we have no control. The rental per ton of coals, at Christmas, 1860, was 33s. 9½d., and, last half year, it was 36s., which is most satisfactory, as it shows there has been good working, and that the leakage is not so great. The net cost of coal per ton, deducting products, was 10s. 10½d., in the half year ending Christmas, 1860, and, for the corresponding period last year, 11s. 7¾d.—being an increase of nearly 7½ per cent., arising from the advance in the price of coal, and a decrease in the price obtained for products. The retorts, per ton of coal, were 1s. 7¼d. in 1860, and, in 1861, 1s. 2¼d.—decrease, 27 per cent. The general wear and tear per ton, which in 1860 was 3s. 1¾d., in 1861 was 3s.—being a decrease of 4½ per cent. Wages and contingencies per ton, in 1860, were 4s. 3½d., and, in 1861, they were 4s. 4¼d.—increase, nearly 2 per cent. Rental, per 1000 cubic feet of gas, in 1860, was 3s. 9½d., and, in 1861, it was 3s. 9¾d. Coke for sale, in 1860, was 57 per cent. of the coals used, and, in 1861, it was 54—decrease, 2½ per cent.

A PROPRIETOR: In the production of gas, I believe we are not confined to the use of coal. We have heard a great deal of mineral oil lately. I have no doubt your attention has been drawn to the subject, and I should like to know whether the directors have sufficient information to enable them to make any communication to the proprietors?

The GOVERNOR: I really have nothing to tell you upon it.

The motion was then put, and carried.

Mr. BOX, referring to what took place at the last meeting, asked whether it was necessary for a director to give notice of his having become a shareholder in another company?

The GOVERNOR said it was. The 29th bye-law required that if any person holding the office of a director should by bequest or otherwise become a proprietor in any other gas company within the limits of this company's operations, he must vacate his office, unless within three months he gave such notice, stating with what company he had become connected, and the number of shares he held in it. The governor then brought up the following report from the court of directors:—"Directors minutes, April 15. Resolved that a dividend at the rate of 8¼ per cent. per annum, free of income-tax, for the half year ending at Christmas last be now declared and reported to the general court of proprietors, to be held on the 2nd of May next." He also moved—"That the dividend declared by the court of directors be approved and adopted, and be payable by warrant on the treasurer on and after the 12th day of May inst."

The motion was unanimously adopted.

Formal resolutions for the payment of dividend upon such part of the fourth capital as is paid up, and for the forfeiture of certain shares upon which the calls had been in arrear for three months, were then adopted.

Mr. BROWN, in a complimentary speech, moved a vote of thanks to the directors for their services.

Mr. PERRY seconded the motion, which was cordially adopted.

The GOVERNOR, in acknowledging the vote, said: Gentlemen, on behalf of myself and colleagues, I beg to return you our sincere thanks for the honour you have done us. It is always most gratifying to receive your thanks; and, I assure you, our best exertions will never be wanting to promote the interests of the company. There is only one point to which I wish to recall your attention. We are under great disadvantages, as compared with three or four of the other chief metropolitan companies, in not having water-carriage to our works. It is a great drawback to us, and we never can work upon equal terms with them. I dare say, it makes a difference of from £8000 to £10,000 a year to us, as compared with them.

A vote of thanks to the auditors having been adopted, the proceedings terminated.

GAS EXPLOSION IN HOLBORN.

INQUEST ON THE BODIES.

On Tuesday, the 22nd of April, an inquest was held in the Student's Room, King's College Hospital, by Mr. Langham, deputy coroner for Westminster, on the bodies of Edward Rawley, aged 30, and John Morrissey, aged 26, two workmen in the employ of the London Gas Company, who were killed by an explosion of gas, in Holborn, on the afternoon of Wednesday the 16th ult. The case excited a great deal of interest, and the inquest-room was filled with engineers and others, whose attention was excited by the remarkable circumstances under which the melancholy accident occurred.

Mr. TINDAL ATKINSON, instructed by Messrs. Crowder and Maynard, appeared to watch the case for the company, and Mr. ISAACSON, surveyor for the Holborn District Board of Works, was also in attendance.

The jury, having been sworn, proceeded to view the bodies. On their return, the following evidence was given.

George Bashford: I live at No. 11, Cardigan Street, Kennington Lane, and am foreman to the London Gas Company. I knew both of the deceased men. Morrissey was a labourer, and Rawley a service-layer in the employ of the company. As foreman of the works, I was superintending the laying down of some new mains in Holborn, last Wednesday. We were engaged opposite Great Turnstile laying the pipes under the foot pavement, at the corner of Featherstone Buildings. I did not notice any escape of gas. I have been engaged in such works for fourteen or fifteen years, and know that it is possible to lay mains without gas being allowed to escape. This accident occurred about twenty minutes to five in the afternoon. At the time Rawley was in the act of connecting the service-pipe of Mr. Warr, the stationer, with the main. He was standing on the main in the footpath, and Morrissey was wetting the clay at the end of the plug, which was in the head of the last length of main-pipe put in. I was about 14 feet from the deceased, when I heard a loud report. Rawley had bored a hole in the main-pipe, and was in the act of putting in the service, when the explosion took place. I am positive that no light was being used by either of the men, as it was in the daytime, and no fire nor soldering operation was required, as the pipe was an iron one, with a thread cut on it, which screwed in a socket. I cannot account for the explosion in any way. When I heard the explosion, I ran to the end of the main, put the plug in again, and covered it with clay. I did not hear any second report. Morrissey had his legs broken by the explosion. He was thrown a little distance, but he crawled out of the trench on his knees. Rawley was thrown on the flat of his back, on the foot pavement, where he had been at work. They were both taken up, and brought to the hospital. I am satisfied the pipes were all sound, and not at all disturbed or broken by anything that was going on beforehand. I did not smell any escape previously, to warn me that any mischief was likely to occur.

Joshua Greenwood: I reside in Paradise Street, Lambeth, and am a labourer employed by the company. I was at work in Holborn, on Wednesday last, at the time of the accident, and was about 5 yards from the deceased; I was transferring services to the new main that had been laid down, and Rawley was engaged with me three minutes beforehand. Morrissey was stopping up the main, and making it secure for the night. I had no knowledge that the main was at all damaged; it was perfectly sound as far as I know. I had not observed the least escape of gas from the time the bladder was put in in the morning. If the bladder is quite sound and blown out, it will keep the gas from escaping a long time. In using the bladder, a hole is drilled in the main, and the bladder being inserted, is blown out, and it then keeps the main quite tight. I have been employed by this gas company for about twelve years. The accident occurred at twenty minutes to five o'clock, but how the explosion arose is a mystery. Ten minutes before I had tapped a hole in the main to connect a service about three yards from where the bladder was, and I did not observe the least escape of gas.

The CORONER: Perhaps, from being so constantly used to it, you would not observe the escape of gas so readily as a stranger would?

Witness: Oh, yes; I should notice it in a minute, if there had been any escape. I assisted Morgan, one of the injured men, after the accident. He is not dead, but I believe is not so well to-day as he has been. Neither of us had a light at the time of the explosion. None of us were smoking. I do not know whether any one who was passing at the time was smoking.

Michael Neal: I reside at No. 11, Vauxhall Walk, and am a labourer in the employ of the company. I was at work near the deceased at the time of the accident, taking up a dead main. When I heard the explosion, I laid down my pick and shovel, and ran towards the place. On my way, I met a plumber, who appeared very much confused. I said to him, "You have done this." At first, he did not make any reply; and, when I said so a second time, he answered, "Yes; I have done it—I know I have done it." I went up to the ganger, George Bashford, and some one asked if any one could tell how it occurred. I said directly, "The plumber has done it; he told me so." I cannot say whether the plumber was in the service of the gas company. He was engaged repairing a water-pipe which we had broken in opening the ground to lay down the main. We often break the pipes in that way; it cannot be helped. There was only one broken at this place. The plumber had a red-hot iron in his hand, and I have no doubt it was that which caused the explosion. He was using it about forty or fifty yards from where the accident took place. I noticed a smell of gas after the explosion, but not before. I have been at the same kind of work about two years, and have seen plumbing work going on at the same time that service-pipes are being laid into mains. I do not know whether it is a usual thing, but I have seen it done. I do not see that it is attended with much danger. When I told Bashford that the plumber had done it, he went to him, and had some conversation about it.

By the JURY: At the time of the explosion, I saw smoke coming from the trench. The plumber had a fire on the other side of the road. He was about fifty yards from where the main exploded. The smoke I saw after the explosion was from the dead end of the main which was being laid. The gas was shut off behind, but I suppose there was some imperfection in the bladder, which allowed it to escape.

George Smith: I am a plumber, and live in White Hart Street, Drury Lane. I was employed by the gas company at the work in Holborn, at the time the explosion took place, repairing a lead water-pipe which had been broken. I had noticed a slight escape of gas from a pipe which was detached about nine feet from where the man fell. I drew the attention of the ganger of the works to it, and he sent a man to secure it. I worked in the same hole for about ten minutes or a quarter of an hour afterwards, and noticed no smell whatever. I then left the hole, and asked the foreman to give me a man to procure another lead pipe, and, while he did so, the explosion took place. I had not been using a hot iron at all that afternoon. There was another plumber at work, I believe. He was about fifty or sixty yards, I dare say, from where the explosion took place. I had not been at work upon that part of the pipe that burst.

Edward Lee: I am a plumber, and reside at 26, St. George's Road, Pimlico. At the time of the accident, I was employed on the spot by Mr. Smith, who had a contract with the London Gas Company to repair the water-pipes that were broken in laying the main in Holborn. I had not noticed any escape of gas prior to the explosion, nor at any time during the afternoon. I was directly behind the place where the first report occurred. I was using a red-hot iron at the time, making a soldered joint. There was first a flash, similar to what it would be from a gun, and almost the same instant there was a report.

The CORONER: Then, there must have been an escape of gas to cause this explosion, although you did not notice any smell?

Witness: There was no escape previously that I am aware of. It must have come almost directly at the time I was using the iron. I do not know but what it might have escaped just while I was taking the metal out of the fire, but I smelt nothing previously whatever. The second report did not take place at the same moment, but there was scarcely any time elapsed. When I heard the first report, I cast my eye up to Mr. Hulett's house, expecting to see part of it fall down, and, by the time I had done that, there was an explosion at the other end. There was no other cause for that explosion that I am aware of. It might be that the gas ignited by the hot iron, but I cannot speak to it positively. I was mending the water-pipe. The gas-main was not injured where I was.

By the JURY: I was about 70 or 80 yards from the spot where the men were killed; just in front of Mr. Hulett's.

By the CORONER: I recollect Neal coming up to me, and saying that I was the cause of it. I do not know whether he had been at work near to me as there were a great many men at work, and I did not notice who they were. I noticed the dead main being taken up behind where I was. The first words Neal said to me when he came up were—"Go down on your knees, and thank God you are alive."

By the JURY: The gas-main where I was at work was bare. It was obliged to be so to allow of our getting to the water-service. It was the new main which the men had finished laying. When I was using my iron, there was a flash came out close to me, just as if you had pulled the trigger of a gun. When I looked up, there was a report at the other end, where the men were at work.

John Porter: I am a plumber's labourer, living in White Hart Street, Drury Lane. I was assisting Lee, the last witness, when the explosion took place. I was carrying metal to him to make a joint in the water-pipe. We had made one joint previously, and had finished the other, with the exception of using the hot iron. My partner called me to bring him the iron. I did so; and, as I was returning to the fire, the explosion took place. My fire was about eight feet from the main in the road. The second explosion was at the end of the main—by Featherstone Buildings. I cannot say whether there was any hole in the main, as I was not in the trench. My partner was the person who did the joints; I only had to supply him with the iron and metal. I cannot say what was the cause of the explosion; but it took place immediately after I took Lee the iron.

By the CORONER: There was no smell of gas while we were preparing the joints.

By Mr. TINDAL ATKINSON: I was in the employ of Mr. Smith, who is a master plumber.

Mr. *John Barr Brown:* I am one of the house surgeons at this hospital. The deceased men were brought here a little before five o'clock. I did not see them myself till about six. Rawley was then in bed, and suffering from compound comminuted fracture of the lower jaw, and compound comminuted fracture of the right shoulder. He had also a slight wound on the forehead. He lingered for a couple of days, and then died from exhaustion, and the shock consequent upon the injuries he had received. At the time I first saw Morrissey, he was on the operating table. Both his legs were completely smashed, and he had a fracture and dislocation of the right wrist. It was found absolutely necessary to amputate both legs, which was performed the same day, while he was under the influence of chloroform. The amputation was well performed, but he only lived two days after the operation. He died from the exhaustion consequent upon the accident.

By the JURY: Before I saw Rawley, he had been partially attended to, his jaw having been set.

The CORONER: How are the other injured men going on?

Witness: One man has gone out to day, and the other man is progressing favourably.

Mr. TINDAL ATKINSON: The surveyor to the Holborn Board of Works, who was on the spot five minutes before the accident, is present, if it is desired to examine him.

The CORONER: If he tenders himself as a witness, I shall be happy to hear him.

Mr. CROWDER: I do not know that he can throw any light upon the subject; but we are anxious to afford every facility for obtaining information.

The CORONER: I should like to have some officer of the company examined.

Mr. CROWDER: The consulting engineer, Mr. Jones, is here; and we will also call any one else your please.

Robert Jones, Esq., examined by Mr. ATKINSON.

I am the resident engineer of the Commercial Gas Company, and consulting engineer to the London Company. I am thoroughly conversant with the operation of opening streets, and laying and repairing gas-pipes, having had long experience in such matters. I have carefully listened to the evidence given to the jury to-day.

Mr. ATKINSON: Are you able, from your practical knowledge and experience, to throw any light upon the cause of this unfortunate calamity?

Witness: In all these operations of laying mains and services, an india-rubber bag or "bladder," as the men term it, is employed, varying in size, according to the diameter of the pipe. A hole is drilled in the main, through which the bladder in a collapsed state is inserted. It is then inflated by the mouth, and the effect is hermetically to seal the pipe, and prevent the passage of the gas. [Bladder produced, and operation explained.]

The CORONER: But is it not an ascertained fact that, notwithstanding the use of these things, there is a considerable escape of gas in all cases?

Witness: No, it is not. I may just state, that I was engaged in the case of the great fire in Wood Street, said to have been occasioned by the men of the Great Central Gas Company. There, all the scientific witnesses gave evidence to the effect that, if there had been a bladder inserted in the main, there would have been no escape of gas, and therefore no accident could have occurred.

By Mr. ATKINSON: The company always supply their workmen with plenty of these things. The only way in which I can account for the accident is this—when the bladders are blown into the mains, there is a little brass tap, which is turned off to keep the bladders inflated. During the operations in Holborn, the workmen have been plagued by the children playing about in the neighbourhood, and have had to apply to the police to keep them away. I imagine that the accident occurred through the brass stop-cock at the end of the elastic pipe on the bladder being interfered with, which caused the bladder to collapse to some extent, and the gas to escape. The workmen generally place a heavy stone over the hole, so as to prevent the tap being turned. About three minutes before the accident took place, the band of the Inns of Court Rifle Volunteers passed along the street, and if, as was possible, some of the people jumped into the trench, in following them, they might have disturbed the tap. In this case, a very small quantity of gas passing would cause an explosive mixture of a very destructive character. From seven to ten parts of atmospheric air to one part of gas, are necessary to form an explosive compound. Nine of the former to one of the latter, is about the strongest. Fortunately for the safety of our houses, the escape of gas is always very perceptible. I was very much surprised to hear the witnesses say that they smelt nothing prior to the explosion; but, it is a proof that very little gas had escaped. It was quite possible for the plumber's red-hot iron to ignite the gas—it does not require flame to do it. After the gas ignited, it would go thundering along the main until it met with the resistance of the plug at the other end, when there would be a violent explosion. It is quite necessary to repair the water-services while the work is going on, and, if the bladders are properly blown in, the main is to all intents and purposes hermetically sealed, and there is no danger. In fact, the men had been working in this way for weeks, without accident of any kind; and I can only account for the explosion by supposing there was some disturbance of the stop-cock at the moment, and that it might have been occasioned by persons jumping into the trench, or, by some mischievous boy turning the tap.

A JUROR: Are there no means of securing these taps so as to prevent the possibility of their being interfered with by children or others?

Witness: The gas company take every precaution to prevent it, and, in this case, they had a policeman stationed there to keep the children away.

A JUROR: But, could there not be some machinery used—something of a cap to screw over the cock?

Witness: We all become wiser after an event—perhaps there might. Generally speaking, a heavy stone is put over the place, so as to prevent any mischievous person from interfering with it, but any one jumping suddenly upon the stone, might have disturbed the tap.

The CORONER: There is a scientific gentlemen, a Mr. Simmons, present, who, I understand, has invented an apparatus which he calls a gas-connector, whereby, such accidents as these may be prevented. He waited on me to explain his invention, and, as I think it is a matter of so much public importance, I propose that he should be called.

The jury having assented,

George Simmons Esq., was called, and produced a model of his recently-patented gas and water-connector. (See JOURNAL OF GAS LIGHTING, vol. x., p. 662.) He said, I am a civil engineer of No. 7, New Palace Yard, and am the inventor of this machine for preventing accidents in making connexions with mains and services. When a bladder is used in making such connexions, I believe, if it is fully blown, and hermetically sealed, no gas will pass; but, in putting in the bladder, in the first instance, there is always an escape of gas, because a hole has previously to be drilled for its reception. My apparatus consists of a small box with a stuffing-gland, and a valve in the interior for shutting off the communication between the main and the atmosphere. When it is attached to the pipe for the purpose of connecting a service, the drill passes through the stuffing-box, so that there can be no escape of gas during the operation of boring the main. After the hole has been made, the drill is partially withdrawn, but left in the stuffing-gland. The tap is then inserted, and the valve is opened, so as to allow of the hole in the main being tapped. The tap is then removed in a similar way as the drill was previously, and the service-pipe is screwed in. The apparatus may be applied in laying mains along the street, and, in that case, no bladders need be applied, because the operation of the same machine I have referred to will effectually prevent any gas escaping. A fire may be placed round during the operation, and no danger need be apprehended.

The CORONER: Do you think the application of your machine would have prevented this accident?

Witness: Yes, it would. At the time of the accident, from what I have heard, there was a hole drilled in the main where the plumber was, and that hole was for the purpose of connecting a service-pipe to Mr. Hulett's house. It was from that hole the gas escaped.

The CORONER: But we are told there was a bladder inserted?

Witness: Still, there was a certain amount of gas that passed the bladder, which was lit by the plumber's iron, and that quantity was certainly more detrimental than if the main had been fully charged with gas. I think, if the main had been fully charged with gas, and it had caught light, there would not have been an explosion; the gas would have burned in a similar way to a common burner in a room. In this case, it became mixed with the air in the other portion of the main, and hence the explosion.

The CORONER: I am sure we are much obliged to Mr. Simmons for attending to explain his invention. I thought the public ought to have the information that there were means of preventing accidents of this kind.

Mr. ATKINSON (to witness): You are aware that this accident did not occur while they were drilling the hole?

Witness: I believe the hole was already drilled.

Mr. ATKINSON: It arose as explained by the engineer, probably from the tap being turned by accident or design, causing the bladder to collapse a little.

Witness: Yes, and there was a hole in the main where the service-pipe was being laid on. If this machine had been used in that instance, certainly no fire would have run into the main.

Mr. ATKINSON: Has your instrument been applied at all?

Witness: Oh, yes, I have applied it in several instances.

George Bashford, recalled and examined by the CORONER: I did not mention that Neal came to me because I could not answer for the truth of what other parties said. I remember Neal saying that the plumber said he had done it. I went to the plumber, and made inquiry, but he gave me no answer. He had previously drawn my attention to a temporary connexion, which he wanted shifted, as it was in his way. I sent a man to do it and to make all secure.

The CORONER summed up the evidence, and left it to the jury to say whether this deplorable calamity was the result of accident or not. Having read some portion of his notes, and commented thereon, he said he thought the jury would have no difficulty in arriving at the conclusion that, however lamentable the result, it had arisen from an accidental circumstance, which could not have been prevented.

The jury consulted for a short time, and then returned a verdict of "Accidental Death," in both cases. The foreman said they desired to express their hope that the company would take every precaution to prevent a similar catastrophe. He suggested that a cap should be screwed over the stop-cock of the bladder, to prevent its being accidentally turned.

Mr. ATKINSON: On behalf of the London Gas Company, I am instructed by the directors to say that they most deeply deplore this unavoidable accident, and that every precaution which human care and forethought could suggest has been always taken by them. With reference to the families of the deceased men, the company will extend their sympathy to them, and do all in their power to alleviate the sorrow which their melancholy loss has occasioned. They have always looked carefully after the interests of their servants, and everything will be done by them in the present case which the public have a right to expect at their hands.

The CORONER: I am sure this communication will be very gratefully received.

A verdict of "Died from an Accidental Explosion of Gas," was then recorded in both cases, and the proceedings terminated.

THE PETROLEUM OIL-WELLS OF CANADA.

[From the *Journal of the Board of Arts and Manufactures for Upper Canada.*]

The successful tapping of the great subterranean sources of Petroleum in Enniskillen has imparted a new and permanent interest to this extraordinary branch of industry and commercial enterprise. A great problem has been solved with respect to the sources of supply. Theoretically, the existence of deep-seated reservoirs of petroleum, occupying fissures and cavities in the rocks several hundred feet below the surface, has been predicted for some time past; but it was reserved for the energy and endurance of one or two individuals to prove their existence by actual and most successful experi-

mental borings. Three "flowing wells" are now in operation, with a constancy and abundance of supply which surpasses the most sanguine expectations; and, as yet we see but the beginning of these extraordinary fountains of oil, for there can be but little doubt that future borings in the vicinity of natural springs will reach the sources from which petroleum has been slowly oozing for centuries, perhaps for thousands of years, throughout the so-called oil region.

When the first petroleum spring was tapped at Titusville, Pennsylvania, in 1859, few persons conceived the vast importance of the discovery, or the astonishing commercial activity to which it would give rise in less than three years time. In 1859, the Philadelphia and Erie Railroad carried 325 barrels of petroleum; in 1860, the amount swelled to 21,794 barrels; and in 1861, the seemingly enormous number of 134,927 barrels were transported along that line alone. This large quantity is exclusive of the supplies conveyed by the Atlantic and Great Western Railroad, and by the flat-boats, which float heavy cargoes to the Alleghany River, and thence to Pittsburgh. Large as these results appear to be, yet they fall into the shade when compared with the present yield, which in the Pennsylvania oil region is estimated at 75,000 barrels a month. No diminution has as yet been observed in the flowing wells; and so abundant and cheap is the yield from this source that nearly all the pumping wells are now idle, and must probably continue so, unless the demand becomes greater than the flowing wells can supply at a very cheap rate.

The Canadian wells now rival those of Pennsylvania. The difficulty that the "oil men" have to contend with is to control the astonishing abundance of the yield, and to store it until a market can be found. The question of supply having been most satisfactorily solved, men are puzzled to know what to do with the treasure they have been so industriously seeking now they have secured more than the most sanguine ever hoped for. The same energy and determination which sought and won it must now be exerted to find a remunerative market for the unexpected and rather embarrassing abundance with which it has suddenly come upon them. The European markets alone are promising, and it is to Britain, France, and Germany, that they must look for aid to help them out of their present dilemma.

The question naturally arises, to what uses can petroleum be applied? We propose to glance at some of the most important practical applications of this abundant natural product, and shall endeavour to show that its general introduction for many purposes in the arts, merely requires time for its properties to become widely known, and the certainty of an unfailing supply firmly established in the minds of those who will become our largest consumers.

Before proceeding to enumerate the different uses to which petroleum can be applied, let us examine the nature of those products which can be obtained from it by destructive distillation.

The following analysis of Canadian petroleum was made by that distinguished practical chemist, Dr. Sheridan Muspratt, who finds the Enniskillen oil to yield, upon distillation,

Light-coloured naphtha (s. g. ·794)	20
Heavy yellow naphtha (s. g. ·837)	50
Lubricating oil, rich in paraffine	22
Tar	5
Charcoal	1
Loss	2
	—100

The specific gravity of the crude oil is ·835, the standard of specific gravity required in England for the best petroleum being ·830.

The light-coloured naphtha is the benzole of the manufacturer. The heavy yellow naphtha is the illuminating oil.

The specific gravity of the Enniskillen oil is very nearly that of the standard. The Pennsylvania oil is considerably lighter, and does not yield so much illuminating oil on distillation. The Canadian oil contains considerably more paraffine than the American, as might be expected from its greater specific gravity. An idea of the comparative value of the Enniskillen petroleum may be obtained by comparing it with Young's patent paraffine oil, of which not less than 8 million gallons are yearly manufactured, chiefly from the distillation of Boghead coal. Canadian petroleum is 25 per cent. (25 p. c.) better adapted for illuminating purposes than the crude oil from the Boghead coal. The royalty on each gallon of Boghead coal-oil is 3d.; the price at which one gallon of the Enniskillen petroleum can be furnished is 2½c., or about equal to the royalty on the Boghead coal-oil paid to Mr. Young for his patent, without the addition of the price of the coal, and all the expenses of the distillation of the oil. Under the disguised name of Belmontine oil, a vast quantity of petroleum illuminating oil, is made in England from crude Burmese petroleum. It pays the enterprising proprietors of the Belmont Works to fetch from the far distant coast of Burmah the crude petroleum of that country. Will it not richly pay them to fetch the crude petroleum of Enniskillen? No doubt, if they knew of the supply, and believed in its constancy, they would gladly seize the opportunities presented to them.

Its Use as a Burning Fluid.—The extraordinary cheapness of petroleum as an illuminator is too well known in Canada to require any special notice. Notwithstanding the comparative dearness in this country and the United States of the chemicals (sulphuric acid and alkalies) which are required to purify, deodorize, and fit it for burning in lamps, yet it is, at 45c. a gallon, incomparably the cheapest illuminator which has yet been manufactured; and it threatens, for domestic purposes, to drive all other means of illumination out of the field. But in Britain, France, and Germany, where acids and alkalies are abundant and cheap, and where all the by-products—such as benzole, tar, &c., can be utilized with profit, the preparation of purified petroleum can be effected at so much cheaper a rate than on this continent as to nearly make up the difference in the cost of the raw material which freight and insurance would add to it. We may then confidently look for the gradual introduction of petroleum as an illuminator throughout Britain and a large part of the continent of Europe, in rural districts where gas is not accessible.

The distillation of bituminous shales for burning purposes has long been practised in France on a very extensive scale; as also the distillation of coal for the same object in the United States. Petroleum has arrested the production of coal-oil or kerosene on this continent; it will soon arrest, if proper steps are taken, the production of shale oil in France and Germany. One ton of cannel coal produces from 50 to 100 gallons of crude coal-oil; the flowing wells in Enniskillen could yield, if they were allowed to pour forth their contents *ad libitum*, as much oil in twenty-four hours, at a nominal cost, as the distillation of 1000 tons of cannel coal could be made to produce. The production of the Valley of Bear Creek, in the township of Enniskillen, is equal to 10,000 barrels a day, if means of storeage were in existence. In Northern Germany, coal-oils are very largely used for street illumination, on the railroads, and most exposed localities. They are largely manufactured in Hamburgh: but, if crude petroleum were laid down in that city, at the cost at which it can be supplied from the Canada wells, freight, insurance, and profit added, the manufacture of coal-oils would cease. In Saxony and in Prussia, the same results would follow; in order to obtain a cheap illuminator, the bituminous shale oil-works so common in those countries would be soon abandoned; for it must be borne in mind that such manufactures in Europe yield but small profits, even with all the skill and science of the German and French practical chemists. The poor shales are cheap, the coals dear; and it is of the utmost importance to notice that, if crude petroleum were imported, it would not occasion any material change in machinery, for the by-products are the chief sources of profit in Europe, all of which, in common with coal, petroleum is capable of producing. These products are: 1st. Naphtha; used as a solvent for caoutchouc, and different resins and gums. 2. Benzole; a valuable substitute for alcohol, ether, and turpentine; it dissolves fats, and is largely used in woollen, cotton, and silk manufactures; it restores faded colours; removes tar, paint, oils, grease, and resin; and is the source of numerous dyes. 3. Illuminating oil; respecting which, nothing further need be said. 4. Heavy lubricating oils; which, when mixed with a certain proportion of other fatty materials, are much used in Europe. 5. Naphthaline. 6. Tar; which, when mixed with a certain proportion of crude oil, is used for the manufacture of gas; or, when mixed with sawdust, as stated hereafter, for fuel. 7. Refuse carbon; suitable for fuel, as shown in the following paragraphs:—

Its Use in the Manufacture of Gas.—Where coal is abundant and cheap, it is not probable that in towns or cities gas manufactured from petroleum will be a successful competitor for public favour, notwithstanding its superior illuminating power and the agreeable softness of the light which it produces. The manufacture of gas from coal has attained such excellence that where the material can be procured at 6s. sterling a ton, the value of the coke and other by-products is sufficient to pay all expenses, and many companies in England could afford to let their customers have the gas at a mere nominal price. But, in districts where coal is dear, and in large buildings not within reach of gas-works, petroleum will become the cheapest source of illumination; and it has been satisfactorily shown in the city of Toronto that it can be manufactured with the utmost ease, to burn without smoke or smell, and to give a light three times as brilliant as ordinary coal-gas, and is capable of being produced at one-half the cost. One gallon of petroleum, converted into gas by the process adopted in the works of Mr. J. E. Thomson, of this city, produces more than 150 feet of gas possessing a very high illuminating power, a soft and agreeable light, with perfect immunity from smoke or smell. One gallon of petroleum weighs 8 lbs. 6 oz., and produces from 150 to 200 cubic feet of gas—a proportion considerably greater than that obtained from coal, even of the richest and best quality. Hence, there is every reason to believe that the manufacture of gas from petroleum will become general in large establishments, in rural districts, and in towns where coal is dear, not only in England, but more particularly in France, and many parts of Germany. In one town in Germany, they manufacture gas from the fat they extract from soap-suds, which are daily purchased throughout the town. It is easy to conceive that the crude petroleum of Canada would soon arrest this ingenious and expensive process.

As before remarked, a large number of patents have been taken out in France for the manufacture of patent fuel, and there can be no doubt that a very valuable, if not an inexhaustible market may be found in France for the crude petroleum of Canada, so admirably adapted to form the means of utilizing combustible products which, without admixture with tar, or similar substances, are wholly valueless. No doubt, the facilities now presented for procuring an abundant and cheap supply of petroleum, would make numerous other products serviceable which are at present lost as waste, or bereft of half their value for the want of a medium to render them capable of being utilized.

Its Use as a Fuel.—Few but those who have visited France can form any idea of the high price of fuel in that country, or of the vast variety of methods which are employed to economize this necessary of life. Patents without number have been granted in France for the manufacture of "artificial fuel." In order to explain this subject more thoroughly, we subjoin one or two of the processes which are largely employed not only in Europe, but also among the half civilized Crientals.

In the neighbourhood of the Caspian Sea, where petroleum springs are abundant, the inhabitants manufacture a fuel by impregnating clay with the combustible fluid; the clods are afterwards burned on an ordinary hearth. The Norwegians have long economized the sawdust of their mills by incorporating it with a little clay and tar, and moulding it into the form of bricks. Of late years in England much attention has been given to artificial fuel in many districts, but not with much success, owing to the want of a suitable combustible, which petroleum is, above all others, best adapted to supply. In France, charcoal is prepared from the refuse of the charcoal furnaces by mixing it with charred peat or spent tar, and then adding tar or pitch. The materials are ground together, and subjected to heat in close vessels to expel volatile gases. From 7 to 9 gallons of tar are mixed with 2 cwt. of charcoal powder.

Gas used as fuel for culinary purposes is daily becoming more common in Europe. It is easy to understand why this source of fuel should be preferred where civilization and luxury have converted mere comforts into actual necessaries of life, which are always secured if money can purchase them. In rural districts, where common fuel is often very expensive, gas manufactured in portable works would be largely used for culinary operations, as it now is where the supply of gas is constant and cheap. But there is no necessity to convert petroleum into gas in order to use it as fuel. Stoves have been constructed for the combustion of this substance without the use of a glass chimney, and without the production of smoke. It will necessarily, from its cheapness, supersede alcohol, which is commonly used as fuel for cooking purposes during the summer months. And we may soon look for its adoption as fuel for the generation of steam in our ocean steamers, where economy in bulk and weight is so great a desideratum. Petroleum is, as it were, the essence of coal, and the question of its adoption as a steam generator is dependent upon the abundance of the supply, to which a satisfactory answer has recently been given by the "flowing wells" of Enniskillen.

Its Use as an Antiseptic or Wood-Preserver.—The cost of relaying the wooden ties and sleepers of railways is enormous. Our readers are familiar with Kyanizing and similar processes. Wood steeped in petroleum, or, what is better, having petroleum forced into its pores by pressure, is proof against decay for many years.

Its Use as a Lubricator.—Even the crude oil is sought for with eagerness for this purpose in many workshops in England where swift motion is employed. When mixed with fat or resin, it acquires greater consistency, and it is more generally applicable to ordinary purposes, but it is the lubricating oil, which is one of the results of the destructive distillation of the crude product, that is and will be most extensively used. Even should the heavy lubricating oil be not used for the purpose its name implies, the paraffine can be extracted by cold and pressure, and candles made from it; so that, under all circumstances, there is no waste nor loss.

Enough has been said to show that the Enniskillen petroleum is admirably

suited for many different purposes—as an illuminator, as a fuel, as material for the manufacture of gas, as a lubricator, an antiseptic, and to these may be added its use in the practice of medicine. We now turn to the difficulty and obstacles which oppose its introduction into the European market. At the beginning of this inquiry, we are staggered by the fact that the present charge on the Great Western Railroad of Canada is, we are assured, three times as great for petroleum as for cattle. A car-load of 55 barrels of oil from Wyoming to Toronto costs $75—a car-load of cattle from Windsor to the Suspension Bridge costs $25, or ONE-THIRD the freight of the oil. It is of the highest importance that a reduction in freight should take place, or that a tramway from the springs to Lake St. Clair be constructed without delay. If it should be found advisable to make Toronto the port of discharge, and thus escape the delays of the Welland Canal, and the cost of transport to Lake St. Clair, railroad freight must come down, or it will be the interest of the "oil men" to make Lake St. Clair their point of departure for Europe.

It is of the highest importance that information respecting the nature and extent of the supply in Enniskillen should be widely distributed, not only in England, but in France, and Northern Germany. Practical illustrations must be afforded the public in Europe that Canadian petroleum can do all that is promised for it. No better opportunity than the present could offer itself for effecting this object. A display of its properties, say in the manufacture of gas, as being the most important, at the Great International Exhibition, held at London in the present year, would prove infinitely more valuable in making it generally known than any number of advertisements. We are assured that it is the desire of the Canadian Commissioners that the Canadian department at the International Exhibition should be illuminated with gas manufactured from Enniskillen petroleum, and Mr. J. E. Thomson, of Toronto, will send one of his portable petroleum gas-retorts, with purifiers and gasometers complete for this purpose. The Canadian Commissioners could have not devised a better plan for directing public attention in England and elsewhere to this new and remarkable source of wealth to Canada. The illumination of the Canadian department by this means will be attended with considerable expense; and, if it should be beyond the limited resources of the commissioners, no doubt the public spirit of private individuals will not be wanting in providing the necessary funds. Practical men like to see and judge for themselves. They receive with many doubts any statements which may be made without practical demonstration. Make petroleum gas before the practical men of Britain, and they will believe their own eyes; tell them all that is true about it without illustration, and they will turn the cold shoulder to statements not accompanied by practical results.

Some idea of the enormous interests at stake in the manufacture of illuminating oils from coal, shale, and Burmese petroleum, in Britain may be formed from the announcement made in evidence at a late trial, that during the year 1861 not less than 350,000 lamps for burning fluids were made by one firm alone. Paraffine oil, amongst other fluids, is sold at 3s. sterling a gallon to burn in these lamps, and, if we assume that gas can be produced at 5s. per 1000, the cost of the light from the paraffine is twenty per cent. dearer than that of gas. But suppose that Canadian petroleum could be laid down in England at 12d. sterling or 25 cents a gallon, petroleum light would be far cheaper than gas, the least expensive illuminator in England. Is not this universal field for enterprise a sufficient inducement for the "oil men" of Enniskillen to put their shoulders to the wheel, and open for themselves a boundless market in England, France, and Northern Germany? Sir Roderick Murchison, in his address on the progress of Geology, recently delivered at Manchester before the British Association, called attention to the "*important discovery of a resinous shale* in Tasmania termed Dysodile, which, like the Torbane mineral of Scotland, promises to be turned *to great account in the production of paraffine.*" We have the paraffine ready formed and associated with rich illuminating oils and other substances in our Canadian petroleum, which shows only two parts of waste in every hundred part by weight. Scottish Torbane mineral, Australian Dysodile, French bituminous shales, German lignites and brown coal, Cuba and Porto Rico asphaltum, must all give way before Canadian petroleum; how soon, depends upon the spirit, activity, and energy of the Enniskillen "oil men." The markets of England, France, and Germany are open to them, if they will take steps to make their "treasures of oil" widely, thoroughly, and truthfully known to the manufacturers of Europe.

METROPOLIS GAS ACT, 1860.

ANNUAL STATEMENT OF ACCOUNTS,

Showing the Actual State and Condition of the Concerns of the Phœnix Gaslight and Coke Company, for the Twelve Months ended the 31st Day of December, 1861, made to Her Majesty's Secretary of State for the Home Department, pursuant to the 41st section of the 23rd & 24th Vict., c. 125.

I. CAPITAL.—*State of the Account at the End of the above Twelve Months.*

Statute, or Authority, under which raised.	Number of Shares.	Amount per Share.	Paid up per Share.	Total paid up.	Total Capital.
Capital raised under 5 Geo. IV., c. 78	9000	£60	£55	£495,000	£540,000
Borrowed moneys					Nil.
Profits capitalized					Nil.
Total capital					£540,000

Balances brought forward.

	Christmas, 1860.	Christmas, 1861.
Reserve-fund	£1,254 7 1	£5,670 12 1
Revenue account	4,681 5 4	6,889 8 5
Dividend ditto	259 12 3	195 10 8

II. REVENUE.—*Account of all Sums actually received and paid during the above Twelve Months, viz—of Assets receivable, and of Liabilities absolutely incurred.*

RECEIPT.

Sale of gas—		
Common gas, at 4s. 3d. and 4s. 9d. per 1000 feet	£109,915 0 9	
Public lamps and other contracts	18,173 18 1	
	£128,088 18 10	
Less bad debts and allowances	957 12 0	
		£127,131 6 10
Rental of meters (none charged)		Nil.
Sale of old materials		504 5 1
Sale of residual products—		
Coke	£28,304 4 6	
Breeze	456 3 8	
Tar	3,625 0 2	
Ammonia	2,170 15 9	
Other waste products	Nil.	
		34,556 2 1
Miscellaneous receipts		Nil.
		£162,191 14 0

EXPENDITURE.

Management—		
Directors allowances	£1,500 0 0	
Salaries of secretary and clerks	1,742 0 10	
Collectors commission and pay	1,762 12 4	
Rent, rates, and taxes of offices (not separated)	Nil.	
Stationery, printing, and general charges	1,987 15 5	
Payments to auditors	100 0 0	
		£7,092 8 7
Manufacture of gas—		
Coals, including carriage, dues, &c.	£37,576 19 6	
Purifying materials	1,119 6 0	
Supervision and labour	12,573 1 7	
Salaries of engineer and superintendents	1,776 7 9	
Tools and other implements	3,260 10 10	
Ordinary repair and maintenance of premises	9,321 9 10	
Rent, rates, and taxes of manufactory	3,433 7 4	
Improvement and extension of premises and machinery (out of revenue)	Nil.	
		89,061 2 10
Distribution, including service-pipes, mains, &c.:—		
Ordinary repair and maintenance of the above	£7,350 2 1	
Rates on mains and pipes	1,527 10 4	
Salaries of inspectors	1,449 4 9	
Wages of lamplighters	2,811 18 0	
Improvement and extension (out of revenue)	Nil.	
		13,138 15 2
Meters—		
Restoring and replacing	2,420 19 0	
Additional (out of revenue)	Nil.	
		2,420 19 0
Law and parliamentary charges		308 8 2
Interest on temporary loans		260 16 9
Balance, being shareholders profit		49,909 3 6
		£162,191 14 0

III. DIVIDENDS.—*Account of all Dividends actually paid in the above Twelve Months.*

Balance, being shareholders profit as above	£49,909 3 6	Dividends on £495,000 capital stock, at £9 and £10 per cent. per annum	£47,700 0 5
		Balance	2,208 3 1
	£49,909 3 6		£49,909 3 6

We have examined the above accounts, and certify them to be correct.

J. E. JOHNSON, *Chairman.*
CHARLES FRIDDEN, *Secretary.*

Share List of Water Companies.

See "Share List of Gas Companies" for Gas and Water Companies.

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
			£ s d	£ s d	£ s d
		Airdrie and Coatbridge			
588	1	Alexandria, Dumb	1 0 0		0 2 6
800	25	Ayr	25 0 0	5 0 0	25 0 0
		Banbury			
		Belper			
4800	25	Birmingham	25 0 0	6 0 0	37 17 6
4800	25	Do., new shares	22 10 0	6 0 0	33 15 0
6000	10	Blackburn	10 0 0		
		Boston			
		Bridge of Earn (Lim.) £450			
		Brighton, Hove and Preston			
8000	25	Bristol	25 0 0	1 8 0	13⅜ to 14¼
		Do., preference			¼ to 1 pm.
		Broadstairs		4 0 0	
		Brompton and Gillingham			
5000	10	Bury and Radcliffe	10 0 0	2 0 0	10 0 0
1333	15	Do., pref. shares	15 0 0	10 0 0	21 15 0
1333	18	Do., do.	6 0 0	10 0 0	14 0 0
2000	10	Do., do.	5 0 0	4 0 0	5 0 0
2000	10	Do., do.	1 0 0	4 0 0	5 0 0
		Cambridge			
1500	20	Cardiff	20 0 0	7 10 0	29 to 13
1500	10	Do.	10 0 0	7 10 0	14½ to 15
	10	Carlisle	10 0 0		13 to 14
		Cheltenham			
		Chepstow			
		Chester			
		Colchester			
175	20	Colne, Lancashire	20 0 0	5 0 0	28 0 0
		Consett District			
		Dartford			
1250	20	Darwen	20 0 0	2 10 0	19 to 19½
1400	5	Deal	5 0 0	5 0 0	5 0 0
1481	25	Derby	25 0 0	7 10 0	50 0 0
400	50	Dudley	50 0 0	1 0 0	20 0 0
250	25	Do., pref. shares	25 0 0	4 10 0	
		Dukinfield			
11600	10	Dundee	10 0 0	5 0 0	11 0 0
2670	5	Dunfermline	5 0 0	2 0 0	2 10 0
	5	Durham	5 0 0		
7360	25	Edinburgh	25 0 0	5 0 0	28 0 0
7360	12½	Do., new shares	12 10 0	5 10 0	16 0 0
7218	6¼	Do., do. ¼ shares	6 5 0	5 0 0	7 0 0
5581	6¼	Do., do. do.	2 10 0	5 0 0	2 15 0
		Exeter	25 0 0	6 10 0	42 0 0
		Falmouth			
		Folkestone			
		Gosport			
	20	Gravesend & Milton	20 0 0	3 0 0	14 to 16
1060	5	Greenock (Shaw's Gravitation)	50 0 0	7 0 0	68 to 70
		Guiseley, n. Leeds			
		Harrowgate			
		Heywood			
1500	10	Kilmarnock	10 0 0	2 0 0	8 0 0
3200	25	Leicester	25 0 0	4 10 0	27 10 0
120	25	Lewes	25 0 0	6 0 0	26 0 0
		Limerick			
720	25	Lincoln	25 0 0	6 15 0	31 10 0
200	25	Do., new shares	25 0 0	4 5 0	26 10 0
		London Comps.—			
47000	10	Berlin	10 0 0	1 10 0	4½ to 5½
	25	Chelsea	25 0 0	4 10 0	23 to 24
	25	Do., new shares	25 0 0	4 10 0	23½ to 24½
		Coln, Middlesex			
975000	Stk.	East London	Stock	6 0 0	127 to 129
8000	50	Grand Junction	50 0 0	7 10 0	73 to 74
5840	25	Do., half shares	25 0 0	7 10 0	36 to 37
2310	100	Kent	100 0 0	5 0 0	101 to 103
1460	100	Lambeth	100 0 0	5 10 0	104 to 106
4120	50	Do., new shares	50 0 0	5 0 0	51½ to 53
		New River		441 6 8	£17,400
1560	100	New River London		per sh.	
		Bge. Annuities	100 0 0	2 10 0	55 0 0
3036	100	Southwark and Vauxhall	100 0 0	6 0 0	123 to 125
3036	25	Do., do.	25 0 0	6 0 0	30½ to 31½
1265	100	Do., do.	10 0 0	6 0 0	
11064	61	West Middlesex	61 0 0	5 0 0	105 to 107
		Do., new shares	6 2 0	per sh. 4 0 0	9 to 9⅛
		Liskeard			
		Maidstone			
		Margate			
		Matlock			
250007	Stk.	Newcastle-on-Tyne (Whittle Dean)	Stock	5 0 0	104 to 105
9600	6¼	Do., do.	5 0 0	5 0 0	5 to 5½
135	20	Newport, Carisbke.	20 0 0	4 10 0	26 0 0
		Newport, Mon.			
		Newry (L.) £6000			
		North Cheshire			
	10	North Shields	10 0 0		10 to 10½
		Norwich			
3600	50	Nottingham	50 0 0	5 0 0	60 10 0
		Pontypridd (Lim.) £3600			
8000	10	Portsmouth	10 0 0	5 0 0	11 7 6
400	5	Ramsey, I. of Man	5 0 0		
1500	10	Ramsgate	10 0 0	6 0 0	13 to 13½
		Reading			
		Richmond, Surrey			
		Rochdale			
		Rothesay (L.) £7000			
		Royston (L.) £2500			
		St. Helen's			
		Scarborough			
		Shefficld			
		Shrewsbury			
		Southport			
11184	10	South Staffordsh.	10 0 0		11 17 0
2554	10	Do.	5 0 0		
		Spalding			
21000	5	Staffordshire Potteries	5 0 0	6 0 0	7 5 0
		Stockport			
1800	12½	Stockton and Middlesborough	12 10 0	6 0 0	
800	12½	Do., A shares	12 10 0	6 0 0	
1591	12½	Do., B shares	7 0 0	6 0 0	
4000	10	Do., C preference	2 0 0	5 0 0	2⅜ to 3
25300	5	Sunderland and South Shields	5 0 0	8 0 0	8 10 0
		Tolcross, Lanark			
		Tweedmouth			
		(Lim.) £500			
		Wakefield			
		Warrington			
		Wellington, Salop			
		Weston-sup-Mare			
		Weymouth			
		Winchester			
		Wirral, Cheshire			
20000	5	Wolverhampton New Co.	5 0 0	4 0 0	5 0 0
6000	10	York New Co.	10 0 0	5 0 0	11 12 6

The Water-Works in the undermentioned towns belong to private individuals :—

Campbelltown. Chidwall (Lancaster). Hyde (Cheshire). Knaresborough. St. Leonard's. Stamford. Tunbridge Wells.

The Water-Works belong to Local Boards of Health, Municipal Corporations, or Commissioners acting under Special Acts of Parliament, in the following towns :—

Aberdeen.	Bradford, Yorkshire.	Dublin.	Ilfracombe, Devon.	Macclesfield.	Pontefract.	Stroud.
Abergavenny.	Brynmaur, Brecon.	Dumfries.	Keighley.	Maidstone.	Poole.	Swansea.
Aberystwith.	Burnley.	East Stonehouse.	King's Lynn.	Manchester.	Port Glasgow.	Teignmouth.
Alnwick.	Bury St. Edmund's.	Ely.	Kirkcaldy.	Merthyr Tydvil.	Preston.	Tormoham.
Ashby-de-la-Zouch.	Carmarthen.	Epsom, Surrey.	Knighton, Radnor.	Montrose.	Pultneytown, Caithness.	Warwick.
Ashton-under-Lyne.	Chelmsford.	Fareham, Hants.	Lancaster.	Nantwich, Cheshire.		Welchpool.
Baildon, Yorkshire.	Chorley.	Glasgow.	Leamington.	Oldham.	Rotherham.	West Cowes.
Barnsley.	Cork.	Gloucester.	Leeds.	Oxford.	Rugby.	Whitby.
Bath.	Coventry.	Halifax.	Leek.	Paisley.	Salford.	Whitehaven.
Belfast.	Croydon.	Hastings.	Leith.	Pembroke.	Salisbury.	Wigan.
Bilston.	Darlington.	Haverfordwest.	Liverpool.	Penrith.	Sheerness.	Windhill, Yorkshire.
Birkenhead.	Dartmouth.	Haworth, Yorkshire.	Llandilo.	Penzance.	Shipley.	
Bishop's Auckland.	Dorchester.	Huddersfield.	Llanelly.	Perth.	Southampton.	Wirksworth.
Bolton.	Dover.	Hull.	Lytham.	Peterhead.	Stirling.	Worcester.

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	26	33	51	70	89	107	126	149	177	208 lb.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1, G.M.B.	3 5 0	2 18 6	2 15 0	3 0 0	3 5 0
1¼ and 2-inch Socket-pipes	7 0 0	6 0 0	6 5 0	6 10 0	6 15 0
2½ and 3-inch ditto	6 10 0	5 10 0	5 15 0	6 0 0	6 5 0
5 and 5-inch ditto	6 0 0	5 0 0	5 5 0	5 10 0	5 15 0
6 inches and upwards ditto	5 15 0	4 15 0	5 0 0	5 0 0	5 10 0
Retorts, 1st fusion, hot blast	5 10 0	4 10 0	4 15 0	5 0 0	5 5 0
Ditto, 2nd ditto, cold ditto	6 10 0	5 5 0	5 10 0	6 0 0	6 5 0
Tank-plates, ¼ thick and above	6 0 0	5 0 0	5 5 0	5 10 0	5 10 0

WROUGHT-IRON TUBING,

Subject to 40 per cent. Discount.

	2 in.	1¼ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 feet—per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto ditto, from 6 inches to 18 inches—each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows (wrought iron)	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, ditto	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	26 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2-quart	15 0	14 0	13 6	13 0	12 0	—

COALS.—*Per Ton.*

Newcastle.—Unscreened.		*Scotch Cannel.*	
Whitwell Primrose	6s. 9d.	Boghead (at Leith)	45s. 0d.
Medomsley, Eighton Moor, and Burnhope	7 0	Kirkness, best	23 0
Pelaw	7 3	Capeldrae, 1st quality	30 0
New Pelton, Pearcth, South Pelaw, Washington Hutton, and South Pearcth	7 6	Ditto, 2nd ditto	13 6
Pelton	7 9	Lesmahago (at Glasgow)	25 0
Ramsay's Newcastle Cannel	16 0	Ditto (at Leith)	27 6
		Arniston	27 6
		Wemyss	20 0
		Knightswood	18 0
		Pirnie	14 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton.		*Foreign.—Per Keel.*	
Chatham and Rochester	5s. 6d.	Barcelona	£34 10s.
Cork	10 3	Bordeaux	15 0
Dover and Folkestone	8s. 9d. to 6 0	Boulogne and Calais	7 7
Dublin	10 9	Cadiz	15 15
Exeter Quay	8s. 3d. 8 9	Cronstadt	12 0
Ipswich	5 3	Copenhagen	9 10
London (Pool)	5s. 4½d. 5 6	Genoa	23 0
Lowestoft and Yarmouth	4s. 6d. to 4 6	Hamburg	£7. 15s. to 8 0
Lynn	6 6	Havre de Grace	£8. 15s. to 9 0
Portsmouth and Southampton	7 0	Leghorn	—
Plymouth	7 3	Lisbon	15 10
Shoreham	6 6	Rotterdam	7 0
Whitstable	5 6	Stettin	10 10
Weymouth	—	Trieste and Venice	£22. 10s. to 24 10

SUNDRIES.

Best Newcastle Fire-bricks—per 1000	£2. 10s. to	£2	15s. 0d.
Cliff's Fire-bricks (at Wortley)—per 1000		2	15 6
Ingham's ditto (at Wortley)—per 1000		2	15 0
Fire-clay Retorts—per foot run	5s. 6d. to	0	7 0
Tough Cake Copper—per ton		98	0 0
English Pig Lead—per ton		19	15 0
Welsh Bar Iron (in London)—per ton		6	5 0
Foreign Spelter—per ton		18	5 0
English Block Tin—per ton		114	0 0
Banca—per ton		123	10 0
Tarred Rope Yarn—per cwt.		1	4 0

DR. J. NORTHCOTE VINEN'S REPORT ON THE GAS SUPPLIED BY THE SURREY CONSUMERS COMPANY:—

1862. Week ending.	Number of Observations.	Maximum Light. Candles.	Minimum Light. Candles.	Average Light. Candles.
April 19	4	13·78	12·54	13·25
„ 26	4	14·81	13·74	14·20

The volume of hydrocarbons, averaged 4 per cent.; carbonic acid, 1 per cent.; sulphuretted hydrogen, none. There were slight evidences of the presence of ammonia on the 25th and 26th.

METROPOLIS GAS SUPPLY.—At a meeting of the Metropolitan Board of Works, on Friday, the 2nd inst.—Mr. Thwaites in the chair—a letter was read from the Westminster District Board of Works, stating non-concurrence in the proposed resolution relative to the settlement of metropolis gas charges. Letters with copy of resolutions on the same subject from the St. Giles's district, and the Vestry of St. Marylebone, were also read. A letter from Mr. Beal, asking permission to attend the finance committee, when the question of the settlement of metropolis gas charges should be considered by them, was also read. The several documents were referred to the finance committee to examine and report upon.

DR. HILLIER'S REPORT FOR MARCH, 1862, ON THE GAS SUPPLIED BY THE IMPERIAL GAS COMPANY IN ST. PANCRAS.—The gas supplied during the month of March has been found on every occasion to be somewhat above the standard of illuminating power laid down by the Act of Parliament. The lowest illuminating power was such that gas burnt as prescribed at the rate of 5 cubic feet per hour, gave a light equal to 12·2 sperm candles; the highest was equal to 14·1 candles; and the average result of 74 observations was 13·2 candles. There was no indication of ammonia, or sulphuretted hydrogen, to test paper in the gas at any time. The pressure varied from about 0·6 of an inch to 2·2 inches. The gas contained in 100 cubic feet, 18·9 grains of sulphur; whilst the Act prescribes that it shall not contain more than 20 grains in the 100 feet.

Advertisements.

In the Press, and will be published in a few days,

THE Gas Consumer's Manual, containing the Sales of Gas Act of 1859, and subsequent Acts, with Practical Observations on the Provisions of the Acts, Instructions to Inspectors, Rules for Testing Meters, &c.

By

T. L. MARRIOTT,
Solicitor and Parliamentary Agent,
and
GEORGE GLOVER,
Formerly Lecturer on Mechanical Philosophy, Royal College of Surgeons, Edinburgh.

LONDON:

Printed and Published by KELLY and Co., Old Boswell Court, Temple Bar; and sold by SIMPKIN, MARSHALL, and Co., Stationers Hall Court; and by JOHN WEALE, 59, High Holborn, and all Booksellers.

TO GAS COMPANIES.

WANTED, by a Young Man of prudent and steady habits, a situation as INSPECTOR or Repairer of Meters. He has been connected with a Metropolitan Work for the last seven years, and is thoroughly acquainted with Meters, wet or dry, and competent to execute in-door or out-door fittings. First-class references, &c.

Address, Y. Z., care of Mr. KISSER, Hand Court, HIGH HOLBORN.

TO GAS COMPANIES.

ON SALE, by Private Treaty, at the Gas-Works, St. Helen's, Lancashire, FOUR DRY-LIME PURIFIERS, with Hydraulic Valve, Connecting-Pipes, Grids, &c.

The Purifiers are 6 ft. by 6 ft. 2 in., with Four Tiers of Grids. The Hydraulic Valve has 8-inch Connexions all complete, with Grids for the Lime.

The whole of the above are equal to new, and are being removed for the purpose of enlarging.

Also, a STATION-METER, capable of passing 7000 cubic feet per hour, with Bye-Pass, Clock, and Tell-tale.

Reference can be made to Messrs. WEST and GREGSON, Meter Manufacturers, OLDHAM.

Apply to Mr. WILLIAM FRITCHARD, Gas Office, ST. HELEN'S.

February 18, 1862.

FOR SALE.—Two Second-Hand Cast-IRON DRY-LIME PURIFIERS, with Wrought-Iron Covers, 5 ft. by 3 ft. in the clear, in good condition. There are two complete sets of Lime Girds of punched plate nearly new.

Apply to ED. COCKEY and SONS, who are manufacturers of Gasholders, Purifiers, Scrubbers, Condensers, and all kinds of Gas Apparatus, and have a variety of patterns suited for Gas-Works of different sizes.

Iron-Works, Frome Selwood.

TO TAR DISTILLERS AND OTHERS.

THE Directors of the Tunbridge WELLS GAS COMPANY will be prepared, on Wednesday the 14th of May next, to receive TENDERS for the purchase of the whole (or any less portion) of the surplus Tar produced at their Works, for one year, from the 14th of May next. Estimated quantity for sale, 15,000 to 20,000 gallons.

The party contracting will be required to provide proper Casks or other vessels, and remove the Tar from the Company's premises at his own cost, at intervals not exceeding Three weeks. Payment to be made quarterly.

Tenders are to be sent to the Office of the Company, Tunbridge Wells, marked "Tenders for Tar," by Six o'clock p.m. on Wednesday the 14th of May, and addressed to the Secretary, of whom any further particulars may be ascertained.

The Directors reserve to themselves the power to reject any Tender.

By order,
JOHN READ, Secretary.

Tunbridge Wells, April 25, 1862.

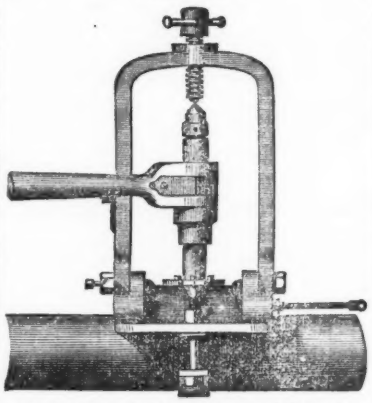
CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Borings.

PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas-Works, in stock, on wholesale prices, at

Mr. LYNCH WHITE'S,
Old Barge Iron Wharf, Upper Ground Street,
LONDON.

SIMMONS'S

PATENT GAS AND WATER CONNECTOR.



This Machine is invaluable to Gas and Water Companies, Gas-Fitters, &c., being the only Connector whereby accidents can be prevented. It is simple in construction, economical in saving the escape of Gas, and can be worked by a labourer.

No. 1 size, to suit ⅜ and ½ in. Services, £6. 6s. each.
„ 2 „ „ ¾ and 1 „ „ £8. 8s. „
„ 3 „ „ 1¼, 1½, & 2 in. „ £12. 12s. „
Including Rachet Brace, Drills, Taps, &c., complete.

MANUFACTURER,
J. COWDY,
BOND COURT, WALBROOK,
LONDON.

Connectors made for fixing on the ends of Mains, to prevent escape in course of laying.

LEONI'S Patent ADAMAS GAS-BURNERS are entirely free from liability to Corrosion, Injury from Heat, or danger of Fraction, and are *unalterable* in the dimensions of their Apertures. Uniformity in the consumption of gas is obtained by the process of manufacture, which insures that the burners shall be precisely similar in pattern.

Net Cash Price, 8s. per gross.

For COUNTRY AGENCIES, apply to S. LEONI, 34, St. Paul Street, New North Road, LONDON, N.

WALTER MABON, Engineer, ARDWICK IRON WORKS, FAIRFIELD STREET, MANCHESTER,

Manufacturer of

IRON TANKS for Gasholders, Railway Stations, &c.

GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought-Iron Structures.

GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Single-lift or Telescope. Contracts for Gas-Works of any Magnitude. Designs, Specifications, and Estimates furnished.

WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.

IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.

PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

WANTED, GAS-WORKS TO PURCHASE OR LEASE.

THE County and General Gas CONSUMERS COMPANY (Limited) are desirous of purchasing or leasing GAS-WORKS on equitable terms.

Application to be made to the Engineer of the Company, Mr. H. P. STEPHENSON, 58, PALL MALL, S.W.

PORTER AND CO.
GAS ENGINEERS AND CONTRACTORS,
LINCOLN;
AND 7, JOHN STREET, ADELPHI, LONDON, W.C.

BENJAMIN GIBBONS, Jun.,
DEEPDALE FIRE-CLAY & BRICK WORKS,
Near DUDLEY,

Manufacturer of every description of Fire-Bricks, Lumps, Quarries, Shields, Flue Covers, &c., to any size or shape required.

FIRE-CLAY RETORTS,
TO MODEL OR DRAWING.

B. G. begs to call the attention of Gas Companies to his Fire-Clay Retorts, which have been used with great satisfaction in some of the largest Gas-Works in the Metropolis and many Provincial Towns in England.

References given, if required.

ROBERT MACLAREN and CO.,
EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

WILLIAM RICHARDSON
(LATE OF DUDLEY),
CONSULTING ENGINEER,
PATENTEE OF THE VERTICAL OVEN RETORT
No. 367, PERSHORE ROAD,
BIRMINGHAM.

ESTABLISHED 17 YEARS.

OFFICE for the Procuration of LETTERS PATENT, and the REGISTRATION of DESIGNS. JOSEPH WILLCOCK and Co., Patent Agents and Engineers, Successors to Messrs. Barlow and Co., 89, Chancery Lane, LONDON, W.C.

GRATIS, and post free, "THE INVENTOR'S MANUAL;" also a pamphlet, "*L'Obtention de Patentes Anglaises;*" 500 MECHANICAL MOVEMENTS; the first part of Kinematics, or the Transformation of Motion. By JOSEPH WILLCOCK, C.E., Mem. Soc. of Eng. May be had at the above address, and of any Bookseller. Price 2s. 6d. The second part is approaching completion, and will shortly be announced.

GEORGE CUTLER & CO.,
GAS ENGINEERS, &c.,
London Gasholder and Boiler Works,
8, WHARF, WENLOCK ROAD, CITY ROAD, N.,
LONDON.

Rye, Nov. 12, 1860.

Dear Sirs,—I consider it incumbent on me to acquaint you that the alterations recently made on the Rye Gas-Works—viz., the addition of a NEWLY-IMPROVED WASHER, and other work for the Purification of Gas, executed by the experienced workmen under your able supervision—are perfectly satisfactory to the Company, and the Gas is now as pure as it can be made.

I am, dear Sirs, your obedient servant,
CHARLES THOMAS, Superintendent,
Rye Gas-Works.

Messrs. Cutler and Co.

JOHN ROGERSON and CO.,
NEWCASTLE-ON-TYNE & MIDDLESBRO'-ON-TEES.

Wrought and Cast Iron Pipes, Cast-Iron Retorts, and all kinds of Foundry Work necessary for Gas-Works. Fire-Bricks and Clay Retorts. Gas Coals of every description. Pig, Bar, and Plate Iron.

LONDON HOUSE:
12, ROYAL EXCHANGE BUILDINGS.

THE

BOMBAY GAS COMPANY

LIMITED

(With a promise of exclusive Privileges from the Government in Bombay).

CAPITAL, £250,000,

First Issue, £100,000, in 20,000 Shares of £5 each.

Ten Shillings per Share to be paid to the Bankers of the Company on Application for Shares, and Ten Shillings on Allotment.

Five per Cent. Interest will be paid from the Date of Payment of the several Calls until Twelve Months after the Company shall begin to supply Gas to the Public.

Calls (not exceeding £1 per Share) will be made at intervals of not less than Three Months each.

A PORTION OF THE SHARES IS RESERVED FOR INDIA.

Directors.

CHAIRMAN—DANIEL THOMAS EVANS, Esq., 5, Elm Court, Temple.
CHARLES FREDERICK COLLIER, Esq. (late of Bombay), Bellair House, Charmouth.
JOHN GILLESPIE, Esq. (Messrs. James Barber and Co.), Leadenhall Street.
WARINE B. M. LYSLEY, Esq. (Director of the County and General Gas Company), Queen's Gardens, Hyde Park.
GEORGE PALMER ROBINSON, Esq. (Director of Chartered Mercantile Bank of India, London, and China), 52, Threadneedle Street.
MAJOR WILLIAM SWAINSON SUART (late Bombay Engineers), Bowls, Chigwell.
HENRY YOUNG, Esq. (late Chief Secretary to Government, Bombay), Palmeira Square, Brighton.
With power to add to their number.

Auditors.

HENRY M'L. BACKLER, Esq., Secretary to the European Gas Company, and Auditor to the Oriental Gas Company.
RICHARD DEELEY, Esq., Auditor to the London Gaslight Company.

Engineer.

THOMAS HAWKSLEY, Esq., C.E., 30, Great George Street, Westminster.

Secretary (pro tem.).

Mr. WALTER LEA PERRINS.

Bankers in London.

The LONDON JOINT-STOCK BANK.

Bankers in Bombay.

The CHARTERED MERCANTILE BANK OF INDIA, LONDON, and CHINA, Bombay, and 52, Threadneedle Street, E.C.

Brokers.

Messrs. CROSLEY BROTHERS, 30, Cornhill.

Offices.

GRESHAM HOUSE, OLD BROAD STREET, E.C.

THIS Company is established to light the Fort and City of Bombay with Gas. Bombay has 400 Streets, and a population numbering upwards of 700,000 souls. At once the Seat of Government of the Presidency, and the *entrepôt* of the vast and extending Commerce of Western and Central India, its limits are continually enlarging, and its population and wealth rapidly increasing. Notwithstanding the urgent need for an economical and brilliant light, the public streets and quays are for the most part unlighted; whilst the Fort, the bazaars and shops, the Government offices, the municipal buildings, the gaols, the churches, the barracks and police-stations, railway-stations, and private houses, have no other light than is obtainable from oil, the cost of which is much greater than that of gas, and has of late years steadily and largely increased. An urgent and growing necessity, as well as anxiety, therefore, exists for the speedy introduction of the European system of lighting cities and towns by means of gas.

The present Company having been projected to supply this want, has met with great encouragement from the Honourable the Governor and Council of the Presidency, who have testified their desire to see this undertaking speedily carried out, by promising a Concession of—

1. The power of supplying Bombay with Gas.
2. An exclusive privilege for the first twenty-one years.
3. A suitable site for the erection of the necessary works.

The Government have also expressed their "readiness to take from the company the lights required for Government buildings and premises."

The Honourable the Governor in Council has undertaken "to recommend to the Legislative Council, that an enactment be passed for the incorporation of the Company" in India; and Her Majesty's principal Secretary of State for India, by despatch of the 31st of August, 1860, to the Governor in Council, Bombay, has expressed his approval by assenting to the grant by the Legislative Council of an Act of Incorporation for the Company.

The undertaking will be carried out in sections (commencing with the Fort, as required by the Government), when and as the demand for Gas increases.

The Directors calculate on supplying Gas to the Fort of Bombay (containing about 80,000 inhabitants) within twelve months from the commencement of the works; and they propose to employ a large portion of the firstly-raised capital in constructing such of the works as are necessary for lighting this important section of the undertaking. After duly considering the estimates and calculations made by the Company's Engineer, of the probable cost and returns of the enterprise, the Directors entertain the fullest confidence that the undertaking will be more than ordinarily remunerative; and, consequently, that it offers a very desirable field for the investment of both English and Native capital. The Directors invite attention to the Letter of their Engineer, Mr. Hawksley, which appears below.

The Shares of the Oriental Gas Company, established to light Calcutta, are now quoted in the public Share Lists at a premium of from 35 to 50 per cent., although the company has only recently come into active operation.

Should a sufficient amount of capital not be subscribed to justify the Directors in proceeding with the undertaking, the deposits will be repaid without deduction.

The Shares will be allotted subject to the provisions of the Articles of Association, which may be inspected at the Offices of the Company.

To the Directors of the Bombay Gas Company, Limited.

Gentlemen,—I have very carefully and very minutely inquired into the prospects of this undertaking, and am of opinion that it is capable of yielding a profit of 15 per cent. per annum; of which 10 per cent. may be properly divided amongst the proprietors, and 5 per cent. be appropriated to the reserve and redemption-funds usually formed by companies interested in enterprises of a similar character.

I have the honour to be, Gentlemen, your most obedient Servant,

30, *Great George Street, Westminster, April* 17, 1862. T. HAWKSLEY, C.E.

Prospectuses, and Forms of Application for Shares, may be obtained at the Brokers of the Company. Messrs. CROSLEY BROTHERS, 30, CORNHILL; and at the Offices of the Company, Gresham House, OLD BROAD STREET, E.C.

GEORGE BOWER,
GAS ENGINEER, MANUFACTURER, AND CONTRACTOR,
ST. NEOT'S, HUNTS.

References to between 100 and 200 Gas-Works Designed and Erected by the Advertiser.

STOURBRIDGE FIRE-CLAY WORKS.
E. BAKER and CO.
(Contractors to Government).
24 WHARF, HARROW ROAD, PADDINGTON, W.
Every article manufactured at their own Works and Mines, Brierley Hill.

FIRE-BRICKS, Lumps, Squares, Tiles, and Gas Retorts of all dimensions.
CRUCIBLE and CEMENT CLAYS.
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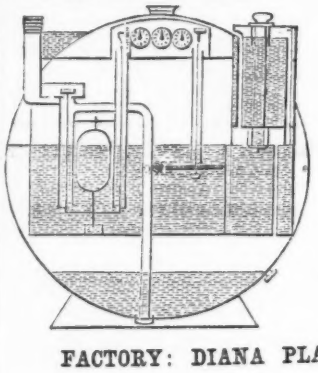

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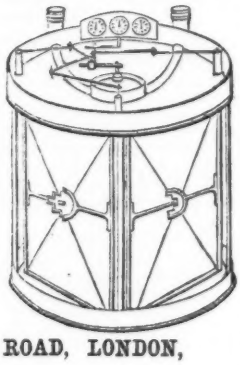

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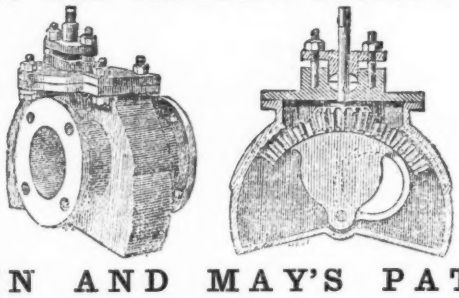

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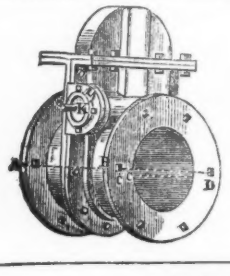

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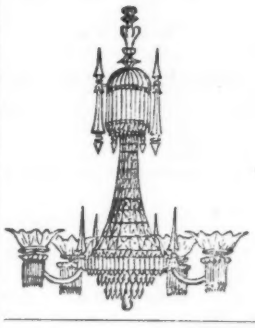

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All Meters warranted to comply with the Act of Parliament.

WOLVERHAMPTON RETORT WORKS.

ESTABLISHED **1840.**

JOHN EUNSON AND SON,

GAS ENGINEERS, AND MANUFACTURERS OF CLAY RETORTS,

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Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.

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MAKER and CONTRACTOR

For Tanks, Roofs, Purifiers, Condensers, Erection and Alteration of Works and every description of GAS APPARATUS.

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Main Laying and Gas-Works erected complete.

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Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.

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Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

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FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

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SELF-ACTING GAS GOVERNOR.

This Instrument, which is designed to replace the ordinary Governor,

Operates solely by the Action of the Gas, without any Alteration of Weights, or the Assistance of any intermediate Agency or Apparatus whatever;

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WORTLEY FIRE-BRICK AND RETORT WORKS,

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W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of

RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,

beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.

The Works are of such magnitude as to ensure the prompt execution of orders to any extent.

Estimates for Setting, or Bricklayers sent when required.

GAS OVENS IN SEGMENTS OF EQUAL QUALITY.

A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.

N.B.—*Export orders continue to have prompt attention.*

CROSLEY & GOLDSMITH'S

PATENT SELF-ADJUSTING & COMPENSATING GAS-METERS

CANNOT BE OVER OR UNDERCHARGED WITH WATER,

and they consequently register the quantity of Gas consumed with greater accuracy than Meters in which the Water-Line is variable

MANUFACTURED BY

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(Late CROSLEY & CO.,)

GAS-METER MANUFACTURER,

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N.B. The Patent Self-Adjusting and Compensating Apparatus may be applied to the ordinary Meter.

Manufacturer of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night.

Also, Manufacturer of EXPERIMENT METERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c., &c., similar to those used by Mr. King, of Liverpool.

I. BRIGGS is also prepared to supply Gas Companies and others with

DUPLICATES of Mr. KING'S CUBIC FOOT TRANSFERRER,

similar to that manufactured by Crosley & Co., and verified by the ASTRONOMER-ROYAL, and PROFESSOR MILLER, of Cambridge, on behalf of the Government, which was deposited by them in the Office of the COMPTROLLER-GENERAL of the EXCHEQUER, before Nov. 13, 1859, in compliance with the "Act for Regulating Measures used in Sales of Gas." He also supplies

TEST GASHOLDERS,

Graduated by the Standard Cubic Foot.

TRUSS'S PATENT ELASTIC PIPE-JOINT,

FOR GAS AND WATER-MAINS, AND STEAM PIPING,

Is the only PERFECT joint that has ever been constructed, and supplies the long-felt desideratum, by allowing for the expansion and contraction of metals, and for oscillation and deflection, without impairing the joint. Gas Companies will effect an incalculable saving in adopting it, as compared with the present imperfect mode of jointing.

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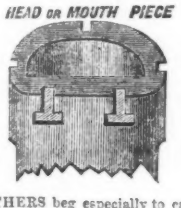
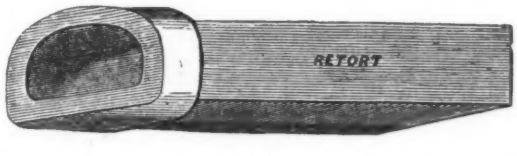
KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.





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Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.

Every Retort and Brick is branded "King Brothers, Stourbridge."

FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.

JOSEPH CLIFF,

WORTLEY FIRE-BRICK WORKS, near LEEDS.

THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.

To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.

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Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

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Employed by the best experimenters in this country and on the continent, and by the Gas Testers in the London districts.

PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, BI-SULPHURET OF CARBON TEST, THOMPSON'S BROMINE AND HEATING POWER OF FUEL TESTS, IMPROVED ALKALIMETER, EXPERIMENTAL METERS AND GOVERNORS, MINUTE CLOCKS, &c., &c.

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These METERS are GUARANTEED to meet all the Requirements of the SALE OF GAS ACT

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